

GET INTO GAS RACING—TRC Python

Radio Control

47380

JULY 1992

CAR ACTION

THE WORLD'S PREMIER R/C CAR MAGAZINE

KISS
THE DIRT

TRINITY
REFLEX 10

FLORIDA
OFF-ROAD
CHAMPS

HOW TO
PAINT TRUCK
BODIES

NO DIRT
HEAP
YOSHO
RAIDER PRO

RACE
TRUCK
TUNING



Pit
Gear
Racer
**MICRO
MENACE**



**Includes
R/C Racer!**

USA \$3.95

CANADA \$4.50



Radio Control CAR ACTION

TRACK REPORTS

29

KYOSHO RAIDER PRO

by Alex Strouthopoulos
Do dirt cheap



Kyosho Raider Pro, page 29

35

TRINITY REFLEX 10

by Frank Masi
Kiss the dirt!

68

TRC/COMPOSITE CRAFT PYTHON

by Jeff Bronstein
Snake charmer

113

KYOSHO CHEVY SPORT TRUCK

by Fred Murphy
California dreamin'



Florida Winter Championships, page 94

DEPARTMENTS

6

EDITORIAL

by Chris Chianelli

8

LETTERS

12

PIT TIPS

by Jim Newman

16

INSIDE SCOOP

by Chris Chianelli

20

READERS' RIDES

180

WHAT'S NEW

186

AD INDEX



Trinity Reflex 10, page 35

COLUMNS

24

TROUBLESHOOTING

by Frank Masi

55

NITRO NEWS

by Jeff Bronstein

154

SCOPING OUT

by John Rist
Schumacher Traco

RADIO CONTROL RACER

94

TEAM LOSI FLORIDA WINTER CHAMPIONSHIPS

by John Huber
10-turns in Tampa

104

SPEED SHOP

106

HOT TRACKS

Cedar Rapids R/C Raceway,
Cedar Rapids, IA

107

RACE TRUCK TUNING

by Frank Masi
Dialing for dirt

FEATURES

23

RAYTEK TEMP GUN

by John Huber • Heat wave

44

AVOID THE PARENT-WIMP SYNDROME

by Mike Hicks • Or, "Keeping it in the family"

51

YONEZAWA PIT GEAR

by John Huber • Micro menace!

61

HOME-BUILT PROJECT: NIGHTSTALKER

by Jeff Smith • It's alive!

64

HOW TO INSTALL RADIO GEAR, PART III

by Stan VanDruff • Capacitor savvy

77

BEGINNER'S KING CAB, PART I

by Bob Carpenter • Ditch those training wheels

83

SERPENT INTERNATIONAL

1/10-SCALE GAS RACE
by Ronald Baar • Flying Dutchmen?

86

HOW TO BUILD A TIRE-TRUING MACHINE

by Russ Toy • Round 'em up

128

PAINTING TRUCK BODIES

by Richard Muise • Do the drip!

Radio Control Car Action (ISSN 0886-1609) is published monthly by Air Age, Inc., 251 Danbury Rd., Wilton, CT 06897. Second Class postage paid at Wilton, Connecticut, and at additional mailing offices. Subscription rates are 1 year (12 issues) \$29.95 (foreign \$42.95); 2 years (24 issues) \$54.95 (foreign \$80.95). Send Form 3579 to Radio Control Car Action, P.O. Box 427, Mount Morris, IL 61054.

ON THE COVER: Trinity's Reflex 10. (Photo by Yamil Sued.) Upper right—TRC/Composite Craft's Python. (Photo by Jeff Bronstein.)

S
T
E
E
T
Z
O

EDITORIAL

GUEST EDITORIAL by CHRIS CHIANELLI



WHEN LUNA and I learned about the cheating that occurred in the Enduro event of the U.S. Masters at Lake Whipoorwill in Florida, we decided to assess the situation. We were quickly chauffeured from the country house (where we've been convalescing) back to reality in our Series III Excalibur. Our capable driver was none other than the inscrutable—yet charming—Brigitte Peugeot, who always takes the wheel during emergencies. (She doesn't accept any back talk from the 400 ponies that reside under the hood—what a woman!)

As it turned out, the story was as hot as the Excalibur's side pipes after some heavy exhaling by the 454 Corvette big-block! It seems that two amateur racers (both Trinity "B-team" members) were caught using 1700mAh SCE cells inside 1400mAh SCR shrink-wrap. However did that happen, boys? What's that you say? You didn't know that the rules required you to use 1400mAh SCR cells *inside*, too?! Sorry; ignorance of the law won't get you off the hook.

Track owner Bob Hosch disqualified both offenders, and he wouldn't back down from his decision. He's to be commended for not looking the other way. I hope that his actions will set a precedent for track owners and race directors to follow and force drivers to think twice before they try such stunts. I think that handout batteries would be the best solution at all sportsman-type events. Not only would it lighten the tech inspectors' heavy workload, but it would also slam the door on this fertile—and tempting—cheating ground.

There will be those who will judge Trinity just because the cheaters were associated with them. There's simply too much cheating going on *everywhere*! A manufacturer can't possibly follow all its team drivers down into their cellars at wee hours of the morning to watch over them. Further, B-team racers are allowed to buy equipment at team discount prices but, other than that, they operate independently. They don't pit with the A-team, and they receive little—if any—assistance at races.

Appropriately, the perpetrators were immediately dismissed from the Trinity team. Trinity supports this hobby by sponsoring races and other programs, so it's obvious that they're in the game for the long haul. They clearly wouldn't risk their reputation and investments by condoning such a cheap trick by B-team rebels.

I do hope that, in the future, you guys will behave yourselves. If not, our termite-infested, Howdy-Doody-head, Executive Editor Frank Masi will, once again, disturb my recuperation in the country with the beautiful caretaker of the cerebrally convalescing—the highly attentive Nurse Peugeot.

Radio Control CAR ACTION

Group Publisher LOUIS V. DeFRANCESCO JR.

Publisher DR. LOUIS V. DeFRANCESCO

Associate Publisher YVONNE M. DeFRANCESCO

Executive Editor FRANK R. MASI

Managing Editor LI AGEN

Alleged Editor CHRIS CHIANELLI

Associate Editor JOHN HUBER

Junior Associate ALEX STROUTHOPOULOS

Copy Director LYNNE SEWELL

Copy Editors KATHERINE TOLLIVER
LAURA M. KIDDER

Assistant Copy Editors DEBORAH S. CARROLL
KAREN JEFFCOAT

Corporate Art Director ALAN J. PALERMO

Associate Art Director MARY LOU RAMOS

Assistant Art Directors BETTY KOMARNICKI
JONATHAN T. KLEIN
MATTHEW J. LONGLEY

Art Assistants STEPHANIE L. WARZECHA
ALLYSON NICKOWITZ

Promotional Artist ROBIN DEMOUGEOT

Staff Photographer YAMIL SUEDE

Systems Manager EDWARD P. SCHENK

Systems Assistants SALLY WILLIAMS
STEPHEN TRAUTLEIN

Director of Marketing GARY DOLZALL

Circulation Manager KATHLEEN RHODES

Marketing Manager PAULINE A. GERRY

Circulation Assistant KYRA MATERASSO

Production Coordinator MARY REID McELWEE

Advertising Director STEPHEN W. WITTHOFF

Advertising Account Representative (East) KURT G. SWENSON

Advertising Account Representative (Midwest) MICHAEL S. STANKIEWICZ

Advertising Account Representative (West) SHARON WARNER

Advertising Traffic Coordinator ELISE SILKOWSKI

SUBSCRIPTION PRICES:

U.S. & Possessions (including APO & FPO): 1 year (12 issues) \$29.95; 2 years (24 issues) \$54.95. Outside U.S.: 1 year \$39.95; 2 years \$74.95. Payment in U.S. funds. Subscription inquiries: 1-800-877-5169

RADIO CONTROL CAR ACTION (ISSN 0886-1609) is published monthly by Air Age, Inc., 251 Danbury Rd., Wilton, CT 06897. USA, Connecticut Editorial and Business Office, 251 Danbury Rd., Wilton, CT 06897. Phone: 203-834-2900. FAX: 203-762-9803. Y.P. Johnson, President; G.E. DeFrancesco, Vice President; L.V. DeFrancesco, Secretary; Yvonne M. DeFrancesco, Treasurer. Second Class Postage Permit paid at Wilton, Connecticut, and additional Mailing Offices. Copyright 1992 by Air Age, Inc. All rights reserved.

CONTRIBUTIONS: All materials published in *Radio Control Car Action* become the exclusive property of Air Age, Inc., unless prior arrangement is made in writing with the Publisher. The Publisher assumes no responsibility for unsolicited material. Only material accompanied by a SASE will be returned.

ADVERTISING: Advertising rates available on request. Please send advertising materials, insertion orders, etc., to *Radio Control Car Action*, Advertising Dept., Air Age, Inc., 251 Danbury Rd., Wilton, CT 06897. Phone: 203-834-2900. FAX: 203-762-9803.

CHANGE OF ADDRESS: Don't miss any issues! Send your new address to *Radio Control Car Action*, Subscription Dept., P.O. Box 427, Mount Morris, IL 61054, six weeks before you move. Include the address label from a recent issue, or print the information exactly as shown on the label. The Post Office will not forward copies unless you provide extra postage. Duplicate issues cannot be sent.

POSTMASTER: Please send Form 3579 to *Radio Control Car Action*, P.O. Box 427, Mount Morris, IL 61054.



Member Audit Bureau of Circulations
PRINTED IN THE USA

DAHM'S

Racing Bodies



'92 OLDS PRO STOCK (D104PS)
Narrow Width - Adjustable Wing!



'92 OLDS STOCK CAR (D104)
Narrow Width - Adjustable Spoiler!



'92 LUMINA - 12th Scale (D147)



'92 T-BIRD - 12th Scale (D148)



BUGGSY™ - (D080) Shown on RC10T
Also fits Outlaw Raider & others!



COMMANDO™ - (D197) On RC10T
West Coast Winner! - Also fits JRXT

NEW BODY COMING SOON!

COMMANDO XL™ (D198) for the LX T
Also fits the Blue Eagle - LS and RC10T!

ALL DAHM'S DUNE BUGGY BODIES
INCLUDE A FREE SUPER FIN WING™.

Exciting New Racing Bodies for the
Hottest RC Cars and Trucks! Ask for
Dahm's Racing Bodies at your hobby
shop! Send \$2.00 for a NEW 1992
Catalog to: DAHM'S, P.O. BOX 360,
COTATI, CA 94931-0360 USA
DAHMINATE THE COMPETITION!
707-792-1316

LETTERS

WRITE TO US! We welcome your comments and suggestions. Letters should be addressed to "Letters," Radio Control Car Action, 251 Danbury Rd., Wilton, CT 06897. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

TO SELL, OR NOT TO SELL...

Would it be worthwhile for me to sell my JR-XT and buy the new LX-T prototype? I'd like to modify my JR-XT truck. Can you give me some hop-up hints? Also, can you give me information on the JRX-Pro? Thank you for your cooperation.

SCOTT P. BRYANT
Oxford, MI

Scott, don't sell your JR-XT! Team Losi offers a conversion kit that will allow you to convert it into an LX-T. It comes with shock towers, shocks, front and rear A-arms, body, springs, steering blocks, hub carriers and the new matrix fiber-resin chassis.

Check out our "Track Report" on the JRX-Pro in the February '91 issue. AS

TOOLIN' RULES

I just want to say that your magazine has the best R/C car coverage! Keep up the good work!

How can I get a copy of the 1992 ROAR Rules? I race at a local carpet-oval track, and I'd like to know the rules for minimum weight, motor type, etc. Any help would be appreciated!

OWEN MARLOWE
Shawnee Mission, KS

Owen, ROAR rule books cost \$5 for members, \$9.95 for non-members. Write to ROAR's administrative office: 288 E. Maple, Ste. 266, Birmingham, MI 48011. If you want to join, write to the same address—or call (313) 644-0669—and ask for an application. LA

SOME QUESTIONS?

I love your magazine; every issue has helped me in some way. My friends want to kill me because all I do is talk about cars

and read your awesome magazine. I need a lot of advice; here are some of my questions.

1. What does a receiver pack do? Can I use one with my Novak NER 2S?

2. Is a receiver pack the same thing as a stutter stopper?

3. Is it true that a Novak T-4 can't handle a CAM 12-turn double motor? (A lot of people say that it can't, but it doesn't get warm.)

4. What gear ratio would you recommend for a 12-turn double?

5. Do I need a superspeedway car for a banked oval, and if so, what would you recommend?

6. I currently have a wide RC10L. Would it be cheaper to buy an RC10L SS kit, or buy just parts to upgrade it?

7. Why don't you sponsor a race team? (very big hint!).

8. What kind of controller would you recommend that can do more stuff than a Magnum JR?

9. My RC10L does around 40mph. Is that fast?

10. Is it true that the Novak T-4 has a thermal shutdown or something like that?

11. Would a heat sink or a litesink make my car go faster?

DAVE WADE
Waltham, MA

Well, Dave, I'll answer your questions in order:

1. A receiver pack is a small battery pack used to power the radio system in place of the standard battery eliminator circuit (BEC). Most electronic speed controllers provide power for the receiver and the servo through the signal wires that connect the receiver to the ESC. This may lead to glitching, because a powerful motor might draw so much amperage that power to the receiver is lost. Yes, you can use a receiver pack with your NER 2S, but follow the instructions outlined in the manual when you connect it.

2. A stutter stopper is a small capacitor that can provide power for the radio system for about 3 seconds in the event of a large current drain.

Andy's

R/C PRODUCTS BEST FROM THE WEST

3. Your Novak T-4 can handle the power of a 12-turn double with no problem.
4. It's hard to determine how you should gear a 12-turn double, because I don't know what kind of batteries you use, or the size of the track where you race. A good starting ratio for SCE's would be 6.5:1.
5. No, you don't need a superspeedway car to run on a banked oval; your 10L would be fine.
6. In the long run, you'd probably save more money by buying the narrow car, rather than converting your 10L.
7. We barely have enough time to do our jobs, much less sponsor a race team!
8. I'm not sure what you mean by "more stuff," but the Airtronics Caliber, the Futaba PCM and the Magnum FM offer more features.
9. Yes.
10. Yes, the Novak T-4 has thermal shut-down. If the speed controller gets too hot, it will automatically shut off. When the speed controller cools down, the unit will begin to work again.
11. A heat sink won't make your car go faster, but it will allow your motors to run cooler, so you can gear up and go faster.

AS

FRANTIC FERRARI FAN

I'm very interested in the Kyosho 1/8-scale, .10 gas-powered F1 Ferrari that Chris Chianelli featured in the "Inside Scoop" of your April issue. I understood from the article that it's currently only available in Japan, but I wonder if you've heard if Great Planes Model Distributors plans to import it to the U.S. in the near future?

ANTHONY CHAN
Seattle, WA

Good news! Anthony, Great Planes is importing the 1/8-scale F1; in fact, Kyosho swapped the .10 engine for a larger, .12 O.S. engine for more power. I've seen the kit, and the car is very cool! Look for a review soon!

AS

(Continued on page 138)



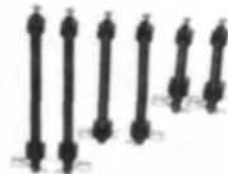
3152 LOTEK GTP, 1/10
Winner of '91 ROAR NATS
4152 LOTEK GTP 1/12 SCALE



RC-10T STADIUM TRUCK
Racing Truck body.
PART # 3033



NASCAR 1/10 • 1/12
SUPER SPEEDWAY 1/10
.030 LEXAN BODIES



BODY POST

- | | |
|------|-----------------------------------|
| 3206 | 2 INCH "ON ROAD" BODY POST (pair) |
| 3207 | 3 INCH "ON ROAD" BODY POST (pair) |
| 3208 | 4 INCH "ON ROAD" BODY POST (pair) |
| 3205 | BODY POST SET "OFF ROAD" |

1710 Grevillea Court • Ontario, CA 91761

(714) 923-6155 • FAX (714) 923-6156

Made In U.S.A.

AUTOGRAPHICS

of California

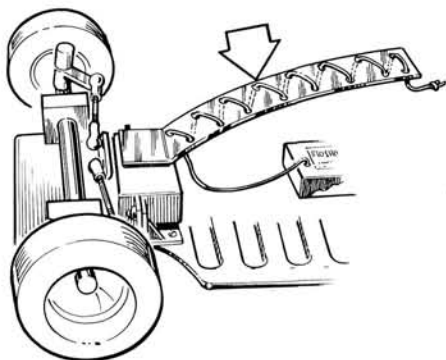
7401-1 WHITE LAKE • BAKERSFIELD, CA 93309 USA
805/836-AUTO (2886) • FAX 805/836-0938

ALL GO AND NO SHOW?

COMPLETE LINE OF QUALITY PRODUCTS
AVAILABLE AT YOUR LOCAL HOBBY SHOP

PIT TIPS

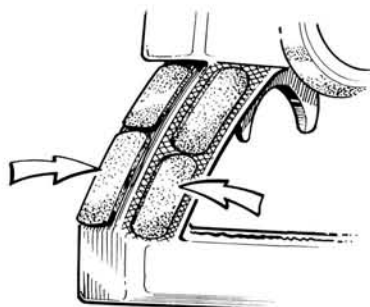
by JIM NEWMAN



INSIDE ANTENNA

Mounting the antenna inside the body keeps it from being damaged and reduces aerodynamic drag. Cut a strip of Lexan from scraps left over from body trimming; drill holes on each side as shown here, then lace the antenna wire through the holes. Bend the strip into a suitable curve and use double-sided servo tape to attach the plastic to the top of the servo.

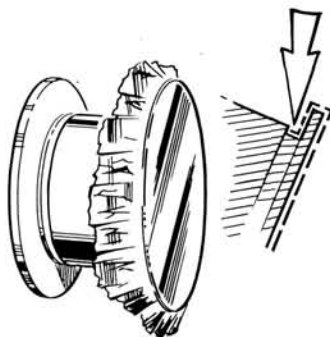
Mike Suit, Chattanooga, TN



NO-SWEAT CONTROLLER GRIP

Self-adhesive foam pads are readily available from cloth or yarn stores. A few of these on the pistol grip of your controller will help you to eliminate sweaty, slippery hands in the heat of racing.

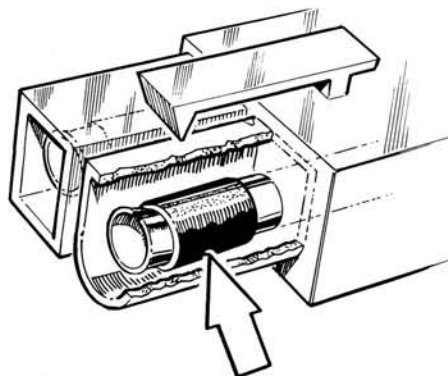
Aaron McDonough, Alpine, CA



LIGHTWEIGHT FLUSH HUB COVERS

Remove the tires and cover the wheels with aluminum foil. Wrap the foil over the edges of the rims, tuck it down into the bead and trim off the excess. Replace the tires, and you'll have the neatest, lightest covers you've ever seen.

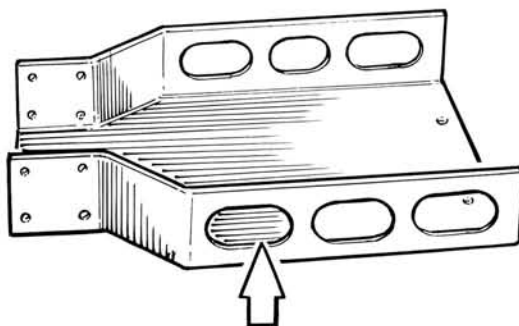
John Kingree, Edinburgh, VA



TIGHTER PIN CONTACT

If you put a small collar of shrink tube around each socket before you push it into the plastic plug body, the socket will grip the pins more securely and have a much better connection—very important as the plugs and sockets age and become worn.

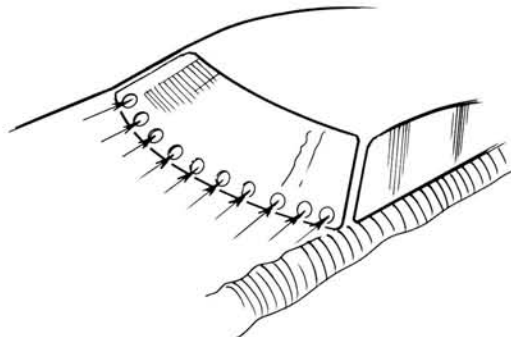
Jim Ashmore, South Holland, IL



CHASSIS WEIGHT REDUCTION—1

Aluminum chassis tubs can be quite heavy, so here's a suggestion for lightening them. If you carefully drill out and file holes in the side frames, you can save weight and improve your car's cornering and acceleration.

Robert Merinsky, Hamburg, PA

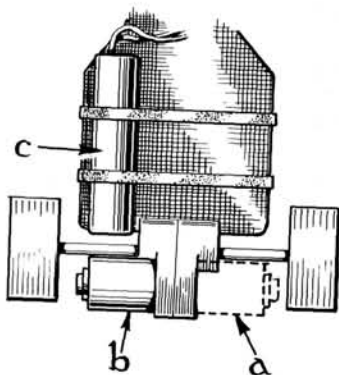


SPEED-CONTROLLER COOLING

Drill a row of $\frac{3}{16}$ -inch-diameter holes across the bottom edge of the windshield. This will provide forced draft cooling to your speed controller—provided that you've allowed plenty of open area at the rear of the body for the warm air to exit.

Ryan Moore, Albert Lea, MN

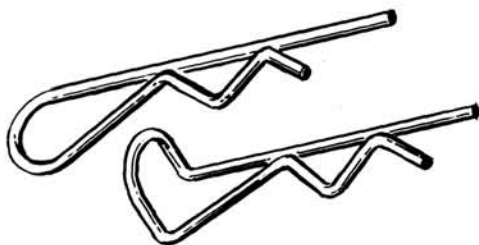
PIT TIPS



IMPROVED LEFT TURNING ON SPEEDWAYS

If you use screws that are 2mm longer than standard and a reverse-rotation motor, you can install the motor on the left side of your FX-10. In the diagram, (a) is the original motor position, and (b) is the new position. Don't forget to put a shim washer between the motor and the transmission to keep the pinion aligned with the spur. Now mount the battery pack at (c). You won't believe how much better the car takes the left turns on speedway-type tracks.

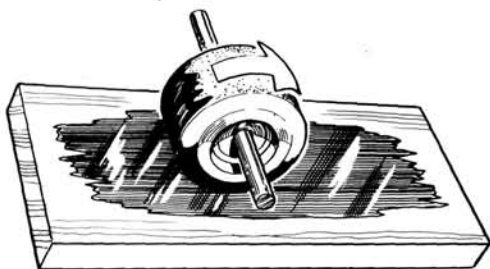
Jon Shill, Ann Arbor, MI



EASY CLIP REMOVAL

If you have large fingers or if the weather is cold, you might have trouble gripping the body clips. Using a sharp tool (such as a screwdriver) to hook them can damage your paint job. If you bend the loop of the clip, you can get a thumbnail behind it, and just a quick flick will dislodge it. Remember: tie the clips to the body shell with a short thread.

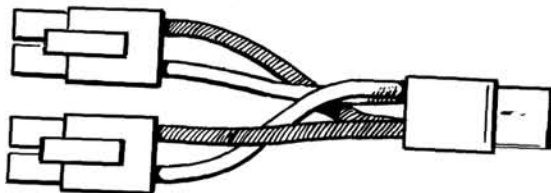
Jeremy Shaffer, Pleasant Mount, PA



FOAMIE SLICKS

Put a generous amount of 3M black weatherstripping adhesive on a piece of plywood or flat plastic, spread it out until it's smooth, then roll your foam tires through it to create homemade slicks. Lay the tires on their sides until the coating cures—about 20 minutes.

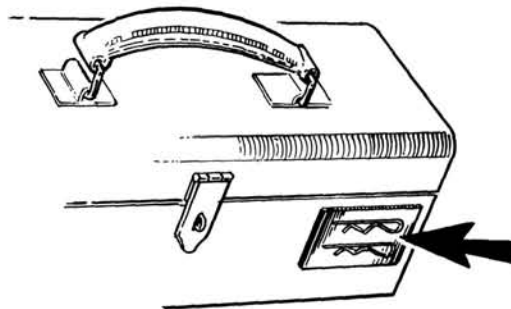
Matt Taylor, Maumee, OH



TWO-PACK Y-CONNECTOR

With this connector, you can run your car with either one or two packs. With two packs in parallel, you'll have double the battery capacity (not double the voltage), which will improve your run time considerably.

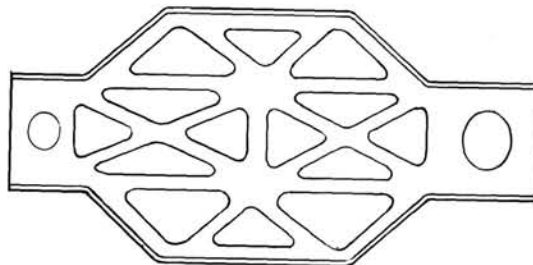
Neal Harris, Bogalusa, LA



BODY-CLIP HOLDER

Put a rectangular self-stick magnet (from Radio Shack) on the side of your pit box. If you don't tie your clips to the car, you can at least park them on the magnet where, hopefully, you won't lose them.

Russell Blinkhorn, Gaithersburg, MD



CHASSIS WEIGHT REDUCTION—2

To reduce weight, drill and file holes in your chassis. To keep dirt out of the car, apply a bottom covering of self-adhesive plastic shelf paper.

Tyson Epperson, Mountainview, HI

Radio Control Car Action will give a free one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send rough sketch to Jim Newman, c/o Radio Control Car Action, 251 Danbury Rd., Wilton, CT 06897. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we cannot acknowledge each one, nor can we return unused material.

INSIDE SCOOP

by CHRIS CHIANELLI



An Alleged Editor's work is never done, especially if he takes orders directly from the exalted one himself, Louis "El Commandante" DeFrancesco, our group publisher and "partner" of the R/C waters. I'm so busy that I have very little time to run much of the stuff I write about.

There's a payoff though: I get all the late-breaking news before those other "fish-wrap" rags—revenge is mine! Anyway, I work for El Commandante, and we all work for you. So many scoops, so little time....



GREAT "NI-CADSBY"



No, those aren't twin air filters under the hood of this 1/18-scale 1928 Burago Mercedes SSK; what you see are two "wafer" Ni-Cd cells! Robbe Model Sport has converted this antique favorite to R/C. It comes in a carrying case packaged with a transmitter—perfect for the traveling executive. Watch for a closer look in an upcoming issue.

EXPLOSIVE PACKS ON THE HORIZON



Horizon Hobby Distributors has offered Dyna-Matched 1400mAh SCR cells with ratings of 280 or better, and now it offers matched, 1700mAh SCR cells with equally good ratings relative to the higher capacity. Horizon claims that, with its accurate matching method, each cell provides the same amount of punch, and this makes the pack more efficient. Six-cell stick or saddle packs and 7-cell stick or hump packs are available. For details, contact Horizon Hobby Distributors Inc., 3102 Clark Rd., Champaign, IL 61821; (217) 352-1913.



Bigger is better when it means exciting heats with 20 cars on the high-banked turns of the huge, new RC Thunderdrome track! The track, which will, of course, again be the site of the *Car Action*

Is Bigger Better?

Superspeedway Shootout and the Futaba Amateur Challenge, has moved to a larger complex in Dominguez Hills, CA. It's so large, in fact, that the roar of 1/4-scale racing will be

heard this year!

The new facility can seat 5,000 people, and it has unlimited parking and pit space and a super-smooth seamless track without any blind spots. It's the perfect place to attempt to break last year's 75.92mph Insane Speed Run record.

This year's Insane Run winner will receive \$500 from Victor

Engineering, and General Electric will buy the Concours-winning car body for \$500 and use it in future advertisements. This year's Media Celebrity Race has received confirmations from the people at "Circle Track," "On Track" and "Car Craft" magazines, who will face the folks from "Motor Trend" and "Hot Rod" in a duel to the death—very exciting!



A Closer Look



Since last month's "Scoop" on Tamiya's new F1 car—"1/14-scale Tamtech"—I've received more photos and decided that a closer look at this interesting vehicle is in order. The Tamtech F1 Ferrari (Lotus body also available) comes with a wheel radio and a new CPR (control processing receiver)—a speed-controller/receiver unit. Dealers should have the cars in stock by the time you read this.

Futaba FXT



Last March, during the RCHTA hobby show in Pomona, CA, Futaba displayed its prototype stadium racer—the FXT. It's available at a price that newcomers will appreciate, and its "upgradable" features, e.g., an aluminum-tub chassis, a ball diff and a good suspension with a lot of travel, give it a solid, competitive foundation. I'll keep you posted on further FXT developments.



1/3-SCALE ICE TAIL

This 34-inch, 12-pound, 1/3-scale, twin-track F1 ice racer offered by Go 'N Play Leisure Products features: a .21 glow engine with a pull starter; fully independent, coil-over shocks; nylon-polyester-reinforced rubber tracks; a floating disk brake; pop-rivet construction; an aluminum chassis; and high-carbon-steel runners. The kit sells for \$695 (retail), complete with pistol-grip radio. For more info, contact Go 'N Play Leisure Products, 6307 Setter Rd., Schofield, WI 54476; (715) 355-1208.

Special Thunderdrome rates are available from Ramada Inn, Delta Airlines and Don Kott Ford car rentals. Manufacturers who plan to enter drivers in the Car Action Superspeedway Shootout should do so soon! This event fills up quickly! For more information, contact Dan Moynihan at (818) 700-6912.



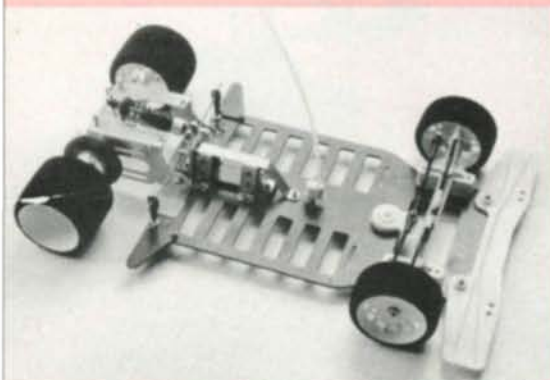
These two new brushes (right) have cavities! According to Trinity, the "cavity" brushes will reduce drag, increase contact pressure and improve performance. They come in hard-copper versions for modified motors and silver-and-copper versions for stock motors. Both designs have dual silver shunts and terminals so that you can install them with a screwdriver.

Also, Trinity now offers matched and "pushed" 1700mAh SCR cells in a variety of assembled pack configurations.

DOES TRINITY NEED DENTAL CARE?



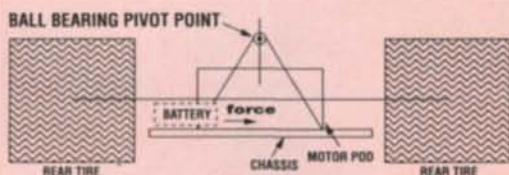
INSIDE SCOOP



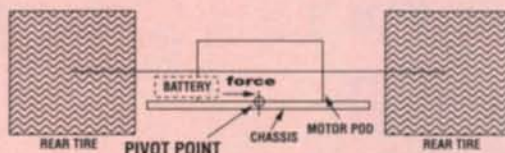
Sassy Chassis claims that the unique Super "V" suspension geometry on its new TTB-10 pan car will keep the inside rear tire firmly planted on the track. On high-speed oval tracks, this will improve the car's ability to handle the high G-forces in the turns. The T-bar and the motor pod on this revolutionary design move like a pendulum, and the raised pivot point has ball bearings so it operates smoothly. The car comes as a rolling chassis complete with ball bearings, aluminum hubs and trued tires. For details, contact Sassy Chassis, 906 Ridgewood Dr., Cary, IL 60013; (708) 516-9834.

Inside Plant

Rear View of New Sassy Car



Rear View of Other Cars



A GUINNESS RECORD BROKEN?



And in this corner of the pit area, ladies and gentleman, it's the heavyweight, in-between-heat-Whopper-devouring champion of the world: the fearless, the merciless—the hungry?!—"Ravenous" Strouthopoulos!! Ravenous has been reported to make 14 Whoppers disappear during a single heat break. That has to be some kind of record—if not a Guinness record then, perhaps, a disgusting one?

ZIP PAK™

Professional Power for Pennies...



It has been said the human hand is better than a computer at assembling battery packs. Don't believe it! Computers don't have bad days. They don't break up with their girlfriends and they don't have headaches. People do. That's why they don't always do the same job the same way twice. They're only human.

That's why Trinity uses an exclusive, computer-controlled, automated assembly system for their Zip Pak. Reliability and consistency are programmed in and never vary.

This automation is combined with the very finest materials. The cells are Sanyo KR1300SC (1300mAh) and there has never been a world champion that didn't run Sanyos. They've never lost! All tabs are pure nickel and as short as possible to minimize resistance. Each is double welded, and all wires are pure copper with silicon insulation. The entire assembly is pressed into a precision fitted tube which protects it from the rough and tumble world of racing.

As the bare, assembled pack nears completion, it is connected to an instrumented quality control panel which measures all facets of the pack's performance. Only then is the Zip Pak label applied.

The result is the lowest cost, highest quality sport pack available.

Buy several as back-up spares. Never be short of power.



Trinity Products Inc

1901 E. Linden Ave, #8, Linden, NJ 07036 • (908) 862-1705 • Fax 862-6875

© Trinity Products, Inc. 1992

Perfect Fit from Parma

This new Toyota stadium truck body has ducting that directs cool air from the outside onto the motor. According to Parma Interna-



tional, it can be dropped right onto the Associated RC10T chassis without needing any modifications whatsoever. The integral hood-scoop/windshield design is also reported to stiffen the body. (The rear wing is included.)

This alcohol-guzzling European "micro-puller" is powered by five Serpent P5 (.21 size) engines. In the Netherlands, sled pulling using such



ALCOHAULERS?



nitro-burning machines has become very popular. They compete by pulling a brake-equipped sled on a 15-meter sand-covered course. The tractor that travels farthest before

succumbing to the progressive resistance of the braking wins. This Modified Class Serpent-powered puller can pull a 30.8-pound load the full distance in less than 3

seconds! For more info on these wild creations, contact Gert Vreemann, Duizendblad 2, 7422 SK Deventer, Netherlands; (31) 5700-52589.

Winning by Design

• The TRINITY Championship Series™ •

Trinity's Championship series of motors is well named. The 1991 record books clearly show the Championship Series has been the hands down winner in all types of modified racing.

1991 NORRCA 4wd Dirt Oval.....National Champion
1991 ROAR 1/10th On-Road.....National Champion
1991 ROAR 2wd Dirt Oval.....National Champion
1991 ROAR 2wd Off-Road.....National Champion
1991 ROAR Monster Truck.....National Champion
1991 Cleveland Indoor.....National Champion

Championship motors are fast and are the first specifically designed to use Sanyo's new 1700SCRC and Panasonic's P170 SCR batteries.

RC1700	Nuclear Meltdown™	(9T, Dbl)	\$80
RC1777	Kevin, Kevin™	(10T, Trpl)	\$80
RC1778	Helter Skelter™	(11T, Quad)	\$80
RC1779	Speed Metal™	(12T, Trpl)	\$80
RC1780	Flash Point™	(13T, Sngl)	\$80
RC1781	Buzz Saw™	(14T, Dbl)	\$80
RC1782	Armageddon™	(15T, Quad)	\$80
RC1783	The Classic™	(16T, Quint)	\$80
RC1708	Joel Magic Johnson®	(17T, Trpl)	\$80

TRINITY

Trinity Products, Inc, 1901 E. Linden Ave. #8
Linden, NJ 07036 • (908) 862-1705 • FAX 862-6875

© Trinity Products, Inc. 1992

READERS' RIDES

"Readers' Rides" is our way of recognizing the unique, innovative—and sometimes bizarre!—vehicles that our readers have created. Send us a sharp, uncluttered, well-exposed color photo of your car or truck (no Polaroids, please!), along with a brief description, to Readers' Rides, R/C Car Action, 251 Danbury Rd., Wilton, CT 06897. If the Ayatollah chooses your photo, you'll receive a one-year subscription to Car Action, or an extension to your existing subscription. You'll also be eligible for the third annual "Reader's Ride of the Year Contest" in the fall of 1992. Write your address and phone number on your letter and on the back of each photo you send, in case we need to contact you.

■ TRUE BLUE TWO

The photo of this dramatic Losi Junior Two comes to us directly from Tinsel Town! Scott Meadow of N. Hollywood, CA, equipped his blue beauty with a Novak 410-M5 ESC, a Reedy Mr. R Ultra Series 16-turn, triple-wind motor and a Magnum Sport 2PB radio.

You know, Scott, it really ought to be in pictures....



■ CALIFORNIA COLLECTION

This colorful collection belongs to Jeff Thorne of Loomis, CA. Jeff says that he's a "Kyosho" man who drives for fun! And why not? With a Big Brute, a USA-1 and three Ultima Pros, he can cover a lot of ground. Jeff has spent much time and money finding trick parts for all of his vehicles; we have to give him credit. (From what he's told us, so do Visa and MasterCard!) Here's your subscription, Jeff! You deserve it!



■ CLOD IN THE COLD

This winter, whenever cabin fever set in, Mark Betzing of Flint, MI, geared up his "Rude Rat" Clod and ran a few errands. (Here, it pulls his friend Brandon to the mailbox!) Powered by a Midwest battery pack and guided by a Futaba Magnum Jr. radio, this Clod creation packs an SCI Monster Card ESC, a Tekin micro receiver, JPS steel gears and an ESP chassis brace. Pretty slick way to chill, Mark!

■ SUMMER SPRINTER

Not only is Greg Jones of Jackson, MI, psyched for summer, he's set for the season with his Kyosho stock car. He replaced its nylon bushings with ball bearings, installed a LeMans 240ST motor and hooked the car up to a Futaba radio system. Sounds like a cool way to beat the heat!



■ TONKA POWER?

Have you ever wondered what would happen if you combined a Tonka cement mixer with a Kyosho Big Brute? Well Rick Lacroix of Cambridge, Ontario, Canada, did, and you can see the result. This "concrete" example of modeling ingenuity is guided by a Futaba Magnum Jr. radio and equipped with two Tamiya speed controllers, two Speedworks 427 motors, two battery packs and ball bearings throughout. Is it any wonder that this monstrosity can pull up to 100 pounds? Rick wanted a "flashy" vehicle, so he added functional headlights and taillights and revolving tow-truck lights!



■ TO BROTHERLY LOVE?

Brothers Norman and Garry Hill have been building models for years, but theirs is no sibling rivalry! Norman, of Winnipeg, Manitoba, Canada, is so proud of Garry's skill that he sent us a photo of Garry's Blackfoot. Check out the striking paint scheme and fine details. Looks like they both have a reason to be proud!



■ MONSTER MACHINE

Dave O'Neill of St. Ferreol, Quebec, Canada, was the mastermind behind this amazing Northern Outlaw Puller. He scratch-built the body by molding sheet plastic over a wooden model (it consists of three sections that he glued together), and he mounted it onto a Bennet Equipment Pro Puller XL chassis. Its other details include six Parma Hemi engines, a steering wheel and instruments (from a Monogram '67 'Vette kit), engine explosion shields and blower security straps. Inside this monster machine is a PDI Hydro Zeta ESC, a Black Magic 550 motor, 14 cells and an S9301 steering servo. How does Dave guide it? With a Futaba Magnum 2PD-FM radio, of course.



IT ISN'T EASY to gauge the temperature of your gas car's engine. Sure, the old "spit" test will give you an idea of how hot it is; if you spit on the head and it boils off almost instantaneously, you can say, "It's really hot!"; but how hot is it *really*? To measure engine temperature more accurately, many racers use non-contact thermometers.

The thermometer shown here is the Raytek® Raynger ST2. It gauges temperature without contact by measuring infrared radiation, and it's accurate to plus or minus 2 percent of the reading, or plus or minus 3 degrees Fahrenheit (whichever is greater). The ST2 is available from Racer's Choice*. It retails for \$299, and it comes with a full, one-year warranty (a pouch is available for \$30).

It's easy to use: simply point the compact, pistol-shaped unit at your subject, squeeze the trigger, and the temperature will be displayed on the LCD screen (you can set it to measure degrees in Celsius or Fahrenheit). When you depress the trigger, the temperature is continually updated, and it will hold the info for a few seconds after you release the trigger. If you need to use the gun at night, a back-light option is available for the LCD screen.

The area that's

measured varies depending on the distance between the gun and the heat source. At 6 inches, the ST2 reads a spot with a diameter of .8 inch; at 10 feet, the spot measured is 16 inches in diameter. For our purposes, the gun should be as close as possible to the engine's head, so that the temperature of the glow plug is read. For consistent readings, always position the gun the same way. Racer's Choice warns that if you alter the gun in *any* way, it might give you false readings, so don't mess with it!

WHAT'S THE MAGIC NUMBER?

OK; so you have an accurate reading of your engine's temp; what does this tell you? Well, now you have a way to gauge your

needle adjustments. Contrary to some people's belief, there's not *one* magic temperature that you're shooting for, because there are too many variables involved. Your optimum temperature will depend on the engine you're using, the fuel, the plug, the ambient temperature and, of course, your needle settings. After some experimenting, you'll discover the temp at which your

engine performs best.

Generally, your engine's temp should be between 230 and 260 degrees Fahrenheit. I've heard of some engines that wouldn't run well until they exceeded 300 degrees, but this isn't usually the case.

I tested my Pirate on a rather cold day, and I found that the car performed best when the engine's temp was between 220 and 250 degrees Fahrenheit.

On a summer day, I'd have to richen my setting to maintain this temperature. (But, again, these numbers will apply only to my setup.)

If you take a reading that's like 400 degrees, you can bet that the sucker is way too lean. *Don't* try to cool it by stopping and dousing it with fuel or water; while it's still running, richen it about a half a turn, run the car around, and check the temp again. This way, you can bring the temp back down slowly without distorting the engine's parts.

WHAT ELSE?

You'll find other uses for the temp gun besides testing your gas engines. I've seen stock-class electric racers use temp guns to determine if their cars are geared correctly. You can also check your batteries during charge or discharge, or check your track's

(Continued on page 66)



Raytek Temp Gun

by JOHN HUBER

Aim the Raytek ST2 at the engine, squeeze the trigger, and the temperature will be displayed on the LCD screen.

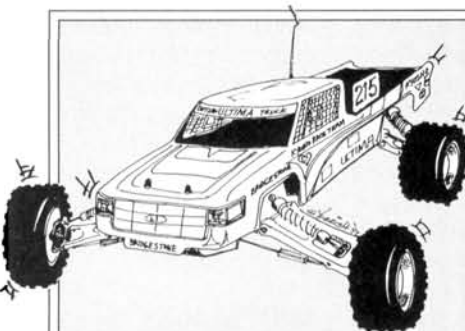


PHOTOS BY JOHN HUBER

TROUBLESHOOTING

by FRANK MASI

Illustrations by GERRY YARRISH



LONG ARMS OF THE LAW

I own the Outlaw Ultima truck and I use the new RC10T thin, front, 2.2-inch-diameter wheels. Every time the truck makes a left turn, the left front wheel lifts off the ground. When it takes a right turn, the right wheel lifts. I extended the front A-arms a little, but it still happens. Should I try even longer A-arms? Should I use standard wheels?

Billy Nadeau
Weymouth, MA

You don't have to modify your truck to alleviate this problem; you just have to tune its suspension a little. It sounds as if your Outlaw's suspension isn't "soft" enough. When it corners, the truck transfers its weight to the outside tires, and the suspension arms for those outside tires are compressed. This allows the chassis to "roll" and absorb the energy of the truck's shifting weight—preventing it from tipping over. If your shocks' damping and springs are too stiff, they won't allow the chassis to roll. Use lighter springs and possibly lighter shock oil, too.

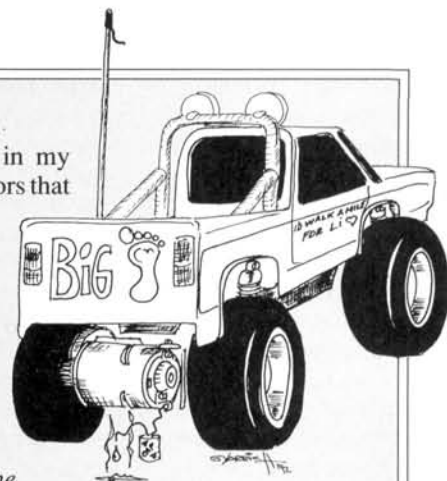
I don't think that the narrow wheels have much to do with the problem, but the tires may be providing more traction than your stock Outlaw fronts; their added bite only amplifies the negative effects of the stiff suspension.

CAPACITOR EJECTION

I use a Joel Johnson Part 2 stock motor in my Blackfoot. After a couple of runs, the capacitors that are soldered to the motor come off. My dad and I have resoldered them many times, but we can't get them to stay on. If it helps, we use 60/40 solder.

Kevin Steinmetz
Madison, WI

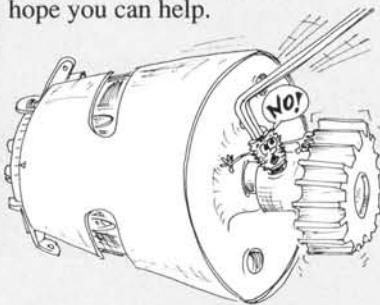
To solder something to the motor can properly, you need a soldering iron that produces at least 40 watts. When you touch the iron to the can, the can absorbs most of the iron's heat. If the iron isn't powerful enough to remain hot, the solder joint will be weak. It's also good to file the can's surface where you plan to apply the solder; removing the can's plating helps the solder to adhere better. A 60/40 solder is fine as long as it's rosin-core solder. Acid-core solder can damage electrical components.



INSECURE SETSCREW

I have a problem with my TQ10. Whenever I drive it over even a slight bump, the setscrew in the pinion loosens and the gear slips. I've tightened it, but it just comes loose again. Is there a simple way to fix this? I also noticed that my rear shocks aren't working right. Whenever I push down on them, they stay down. I hope you can help.

Doug Dickey
Ventura, CA



To prevent your setscrew from falling out, you must tighten it sufficiently with a good Allen-head wrench—one that won't strip the setscrew. If your wrench is stripped, grind the head until the stripped section is gone. Companies such as Thorp and Trinity offer special "unstrippable" pinion-gear wrenches that work very well, and you can buy replacement setscrews at your local hobby shop. Don't use thread-locking compound on the pinion's setscrew; you'll almost certainly strip it when you try to remove it. Also, make sure that the pinion gear is mounted on the motor shaft so that the setscrew is aligned with the shaft's flat area.

It sounds as if your car's shock collars need to be adjusted. To set the ride height of your car, drop it from a height of about 6 inches; your car's ride height is correct when its rear A-arms are almost parallel with the ground (when viewed from the rear), and its fronts are slightly above parallel. To adjust them, loosen their clamping screws and slide the shock-spring retaining collars up or down until you attain the desired ride height, then tighten the screws.

If you have a technical problem that your hobby shop or racing friends can't resolve, give us a shout at Radio Control Car Action, and we'll see if we can chase down an answer for you. Questions should be of a technical nature and should be addressed to Troubleshooting, c/o Radio Control Car Action, 251 Danbury Rd., Wilton, CT 06897.

RUNNING WITH THE BALL (DIFF)

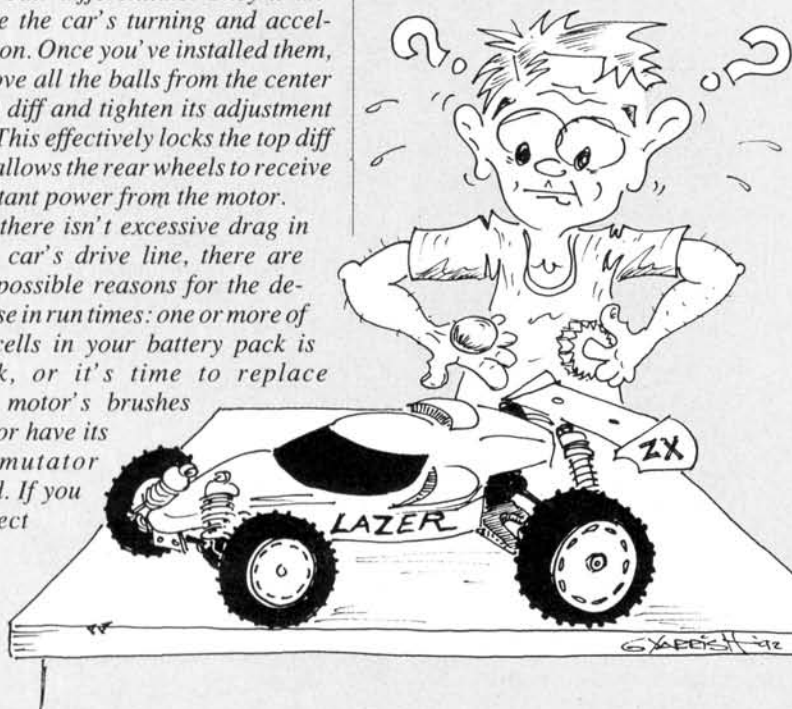
I own a Kyosho Lazer ZX with a Novak 410 ESC and 2x, a Futaba 2PBKA Magnum Junior radio with a S148 servo and a 16-turn Kyosho Mega Motor. My car came with gear differentials; would it be a good investment to buy ball differentials? Lately, my run times have decreased noticeably. I made sure that every bearing was very clean, and I lubricated all the moving parts. What's wrong? One more thing: the Lazer has made me such an enthusiast that I'm thinking of purchasing either a Schumacher Cougar 2 or a Losi JRX-Pro. Which do you recommend? The Lazer is better than I can express and so is your magazine.

**Casey May
Raleigh, NC**

If you plan to keep your Lazer, then I definitely recommend that you install ball differentials. They'll improve the car's turning and acceleration. Once you've installed them, remove all the balls from the center (top) diff and tighten its adjustment nut. This effectively locks the top diff and allows the rear wheels to receive constant power from the motor.

If there isn't excessive drag in your car's drive line, there are two possible reasons for the decrease in run times: one or more of the cells in your battery pack is weak, or it's time to replace your motor's brushes and/or have its commutator trued. If you suspect

that your batteries are the culprits, monitor each cell's temperature while you charge the pack. If there's a bad cell, it will become warm before the others do—before the pack is fully charged. A battery pack is only as strong as its weakest cell, so replace bad cells promptly. If all the cells are good, make sure that you're discharging your packs sufficiently before you recharge them. Either run the car's motor until it stops (hold the car's rear off of the ground; the car's radio system will lose power when the pack's voltage drops below a certain level), or discharge the pack using a "dumpster" (see Car Action August '90). Allow enough time for the battery to cool to room temperature before you recharge it. Note: if you use SCEs, don't charge them more frequently than once every three or four days.



PRO-LINE® RED TIRES DOMINATE

2.150" SERIES

PRO-22



WORLD'S SPECIAL EDITION
APPLICATION: Soft to Medium Track Conditions
DESIGN: Spike
Fits 2.150" PRO-LINE* or 2.2 Rear Wheel.

PRO-81

WINTER CHAMPION MINI-PIN
APPLICATION: Medium to Hard Track Conditions
DESIGN: Mini-Pin
Fits 2.150" PRO-LINE* or 2.2 Rear Wheel.



PRO-82



ULTRA MINI-PIN "FUZZIE"
APPLICATION: Medium to Hard Track Conditions
DESIGN: Ultra Mini-Pin
Fits 2.150" PRO-LINE* or 2.2 Rear Wheel.

PRO-101

WORLD'S SPECIAL EDITION
APPLICATION: Soft to Medium Track Conditions
DESIGN: Stepped Spike
Fits 2.150" PRO-LINE* or 2.2 Rear Wheel.



*Fits PRO-LINE 2577 (RC10) or 2578 (LOSI)

Racing To Bring You The Best!

PRO-LINE®

Race Engineered Design

P.O. BOX 456, BEAUMONT, CA 92223
(714) 849-9781

SEND \$2.00 FOR OUR FULL LINE CATALOG

COMING NEXT MONTH!

RADIO CONTROL CAR ACTION

TRUCK OF THE YEAR

FEATURES

Time Warp: Cox Scorpion
How to Rebuild Gas Engines
Speedworks Race

R/C RACER

1/8-Scale Gas Enduro
Build a Pit Stop Radio
Speed Shop
Track Directory



TRACK REPORTS

Kyosho 1/8-Scale Ferrari
Bolink LTO QC
Schumacher Storm
Tamiya Mazda

COLUMNS

Nitro News
Scoping Out
Troubleshooting

TROUBLESHOOTING

SHOCK SPILLAGE

I have a Championship Edition RC10, and every time I push the car down and compress its suspension, oil leaks out of the tops of the shocks. I've tightened the tops of the caps as much as I can, but they still leak. Do other shocks do this? What can I do? Is the Novak 610-RV ESC with reverse good for racing an RC10?

Mark Parsneau, Onalaska, WI

Don't replace your RC10's shocks, Mark; they're among the best in the business. The Championship Edition RC10 comes with plastic disk seals for the tops of the shocks, and these can leak. Replace them with Associated's black O-ring seals (part no. 6469). I guarantee that they'll stop your leaking problems. (MIP also offers similar seals.)

I recommend that you invest in a forward-only ESC. ROAR rules, and those of most clubs, prohibit the use of reverse during competition. Also, the 610-RV has a slightly higher "on" resistance than forward-only ESCs, because its Mosfets are divided between forward and reverse functions. Novak's 410-M5 is a good forward-only ESC, and it costs less than the 610-RV.



FET SERVO PROBLEMS

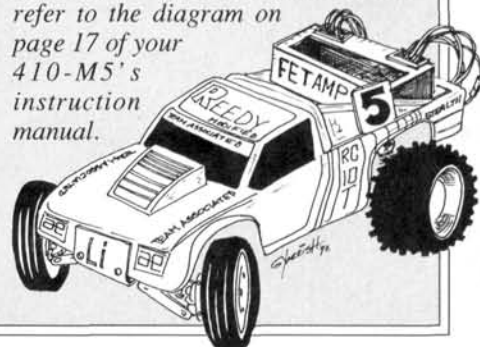
I've been having problems with my RC10T. I run a Novak 410-M5, RPM 17-turn motor (with three capacitors installed), a PS-303 FET-boosted servo, and an EX-1 radio with a KR-290A receiver. Whenever I turn everything on, the car acts as if it has a mind of its own. The motor runs only at full speed and it stutters, the servo darts wildly back and forth, and, if I push the throttle back and forth, the steering responds slightly! I think the problem may be in the connection between the servo's FET amplifier and the ESC, or it might just be the frequency. Help!

Chris Shipp
Tucson, AZ

To determine which component is causing the problem, unplug your servo from the receiver and turn on the radio system. If the ESC functions properly, turn the system off and plug the ESC lead into the steering-servo port on the receiver. If the ESC still functions (it will be controlled by the transmitter's steering wheel or stick),

the problem is in your servo; if it doesn't function correctly, the problem is probably in your receiver's steering channel. If, however, the problem exists when you disconnect the steering servo from the receiver, then either the ESC or the receiver has been damaged, in which case you should return the equipment to the manufacturer for repairs.

The Novak 410-M5 accepts FET servos, but you have to install a 3.9 to 10.0 micro Henry inductor between the ESC's red FET servo-power lead and the servo's amplifier. You should also install a 47 microfarad, 25V electrolytic capacitor between the battery negative (black wire) and the FET servo lead. For details of this hookup, refer to the diagram on page 17 of your 410-M5's instruction manual.



Off-Road Riot

by ALEX STROUTHOPOULOS



KYOSHO Raider PRO

WHAT WERE YOU interested in the first time you bought a car? A ball diff, oil-filled shocks, or fun? Most likely, you wanted fun. Kyosho's* new Raider Pro is a basic off-road car that's designed for easy assembly and low maintenance—and guess what?—it's a blast! Basic friction dampers on all four corners provide a smooth ride, a beveled gear diff in the rear transmits power to each wheel and a tub chassis keeps the dirt out. With these features, the Raider Pro is perfect for running at the local dirt track or for thrashing in your backyard.



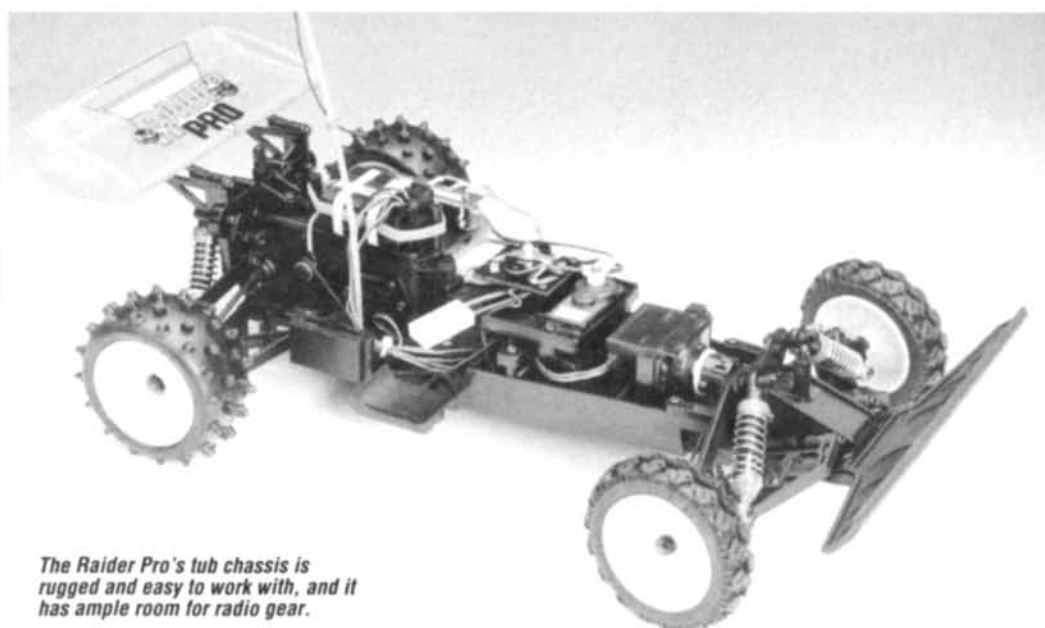
FAB FEATURES

The Raider is equipped with several exceptional features. The molded-plastic chassis is surprisingly rigid and strong, owing to two large channels that run the length of the chassis. The front end has a single A-arm/upper control-link setup that's connected to small, coil-over friction dampers. The front steering blocks and caster blocks have been molded with extra material to ensure that the Raider can take severe beatings and still remain intact.

The Raider's rear setup is similar to the front. Although the camber rods on the front and the rear are of a fixed length, they're set perfectly. A pair of sturdy wing mounts similar to those used in Kyosho's top-of-the-line Lazars and Triumphs keeps the wing in one piece (even after a major rollover), and a one-piece shock tower/body mount connects the rear suspension to the gearbox.

TRANNNY

The instructions for the gearbox assembly seemed familiar, but it wasn't until I was actually putting it together that it dawned on me: the Raider's gearbox is almost exactly the same as the one on the Kyosho Rocky! This might not mean anything to you, but the Rocky was my *first* R/C car! I thrashed it to pieces and still had fun with it! The Rocky initially ignited my R/C passion. Because I knew this gearbox inside and out, I was pleased to see that changes had been made to the Raider's gearbox that would alleviate the problems that the Rocky had.



The Raider Pro's tub chassis is rugged and easy to work with, and it has ample room for radio gear.

The gearbox is driven by a mid-mounted motor, and power is delivered through a set of counter-gears to the differential. All the tranny's rotating parts are supported by metal bushings, and this is a *big* plus. Plastic bushings (common in entry-level kits) quickly lose their tolerance and develop "slop," and this degrades performance significantly.

One interesting note about

the motor mount: instead of the sliding type found in most cars, the Raider Pro has mounts for each gear ratio. For example, when you use the 15-tooth pinion, you use screw holes A and D, but for a 16-tooth pinion, you use holes B and C. This helps beginners avoid setting the gear mesh incorrectly.

The factory-built beveled gear diff lacked the smooth action normally associated with a

"I OPENED THE THROTTLE AND THE RAIDER ROSE TO THE OCCASION...WITH AMPLE POWER AND LONG RUN TIMES, THE RAIDER WAS A BLAST TO DRIVE."

RAIDER PRO

Manufacturer Kyosho
Type Off-road buggy
Scale 1/10
Price \$109.99

DIMENSIONS:

Overall length 17.5 inches
Width 9.75 inches
Wheelbase 10.187 inches
Front track 8 inches
Rear track 8.25 inches

WEIGHT:

Gross (with battery) 3 pounds,
 1.83 ounces

BODY:

Type Single-seat buggy
Material Polycarbonate

CHASSIS:

Type Tub
Material ABS resin

DRIVE TRAIN:

Primary Gear
Transmission Gear reduction
Differential(s) Beveled gear
Bearings/Bushings Metal bushings

SUSPENSION:

F/R: Type Lower A-arm/upper control link
Damping Coil-over friction shocks

WHEELS:

Front: Type One piece
Dimensions (DxW) 2.0x.75 inches
Rear: Type One piece
Dimensions (DxW) 1.9x1.25 inches

TIRES

Front S-tread
Rear Spiked

ELECTRICS:

Motor Mabuchi RS-540 SH
Battery 6-cell stick *
Speed Controller .. Mechanical three-step

OPTIONS AS TESTED:

KO Propo EX-5 radio,
 PS-701 servos, KR-288 receiver

COMMENTS:

The Raider Pro is the perfect car for beginning R/Cers. Assembly's a snap; most people should be able to build the Raider Pro in a few evenings. Metal bushings are a big plus, especially when you consider the kit's low price. Performance is decent, and the "fun-factor" is high. Spare parts and hop-ups are readily available at most hobby shops.

* not included

RAIDER PRO

gear diff, so I disassembled it. It was adequately greased, so I concluded that it needed to be broken-in; after I ran the car a few times, the action was smoother. When the tranny is fully assembled, attach the rear suspension to the back of the

tranny, and then mount the tranny/rear-end assembly to the chassis.

RADIO INSTALLATION

Next, I installed the radio gear. The Raider requires either two servos and a receiver, or a single servo, an electronic speed controller and a receiver. I wanted to run the kit box-stock, so I used the two-servo setup with the kit's mechanical speed controller. I chose my trusty KO Propo* EX-5 radio for this assignment. The EX-5 comes with two KO Propo PS-701 servos and a KR-288 receiver—all the racing features you'll need—and it's inexpensive.

For steering, install the servo on its side, and attach two Z-bend connectors to the supplied servo-saver. I found that the Z-bend ends touched and locked-up the steering when the servo was turned from full left to full right, so I filed the ends of the Z-bends until they operated freely. Install the throttle servo in the small tray that also holds the speed controller. Then, bolt down the tray and connect the wires. The numerous wires that exit the speed controller may make connections confusing for beginners, but you shouldn't have too much trouble if you pay close attention to the manual.

Kyosho must think that Raider Pro owners are going to have some serious crashes, because they recommend that you install the receiver so that it's suspended by a taut rubber band. This kind of mounting is common in 1/8-scale gas cars, because the rubber band damps engine vibrations and prevents receiver destruction.

Next, I turned my attention to the tires and rims. They aren't great for racing, but these tires should have a long tread life and provide adequate traction on many surfaces. The hot yellow rims look like smaller versions of Kyosho's 2.2-inch racing rims. When you mount the tires to the rims, secure them with a few drops of CA.

BODY WORK

To complete the Raider, paint and mount the body. Don't forget to trim the body and wash it in warm, soapy water before you paint it. Mask the windows, and paint away! (Check out Richard Muise's painting and detailing articles in the June, July and August '91 issues of *Car Action*.) I sprayed the body with Pactra* Blue Streak paint. The Raider comes with a complete decal sheet; a few well-placed decals make this simple paint job look great.

RAIDER PRO-FORMANCE

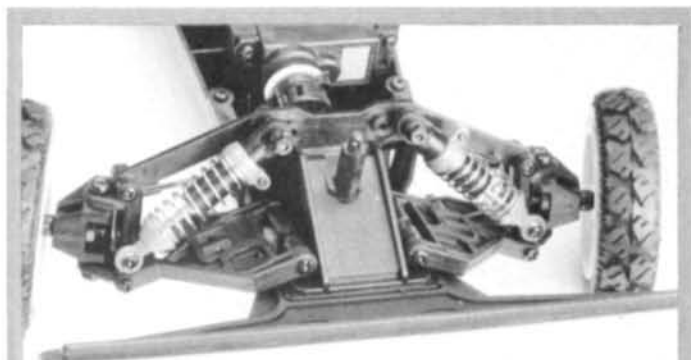
Outfitted with a charged 6-cell pack, the Raider was set to go. I tested it at a local track, taking the first lap slow to set the trims and get a feel for the car. Then, I opened the throttle and the Raider rose to the occasion. Although it isn't an ultra-fast modified, the stock Mabuchi RS 540-SH motor was no slouch. With ample power and long run times, the Raider was a blast to drive. It isn't a race car, but it handled the challenging course rather well.

Where the terrain was nasty, however, the stock friction dampers weren't up to the task. When the car hit big bumps, the lack of damping caused the suspension to quickly bottom out and then return almost as quickly, giving the Raider the look of a '70s GM sedan. All in all, I had an incredible amount of fun—more than I usually have when I compete with my race car. I left the track with a smile on my face.

OPTIONS

When I got home, I thought about what I could do to the Raider to improve its performance. In a Tower Hobbies* catalogue, I found that Kyosho makes oil-filled shocks for the Raider, and adjustable tie rods to replace the stock fixed-length rods. Both options will allow the car to perform better, but at a price. Speaking of price, it's the Raider's strongest advantage.

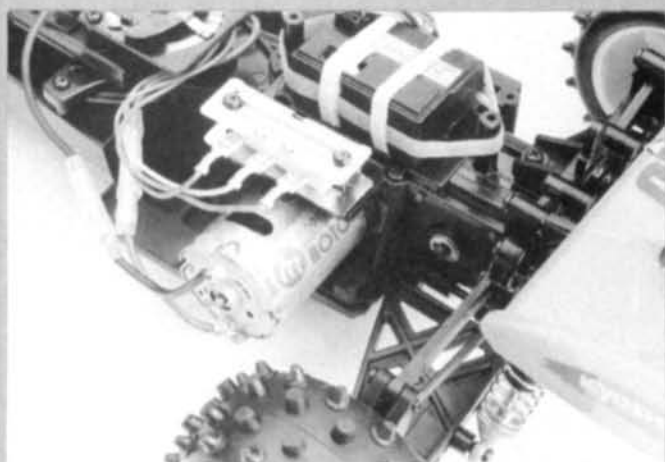
(Continued on page 66)



For the front suspension, the Raider uses a single A-arm/upper control-link setup. The friction shocks aren't as smooth as oil-filled ones. The large bumper helps to keep the front end in one piece, even during severe head-on collisions.



The independent rear suspension with friction dampers keeps the tires in contact with the road at all times. The upper camber rods are molded to the perfect length, and this makes it easy for beginners to set up the car.



The kit's Mabuchi RS 540 motor isn't a fire-breather, but it offers enough power and long run times. Notice the cooling plates above the motor; they act as a heat sink for the speed controller's resistor.

TRACK REPORT



Whats



Cool



Fast

&

LOW



?



Chum &



T R I N I T Y

by FRANK MASI

REEL

In the early days of R/C, dirt-oval cars were nothing more than converted off-road cars. Racers would modify any popular 2WD chassis by repositioning the shocks to lower the suspension and by adding foam tires, a wedge, or an "outlaw" body.

As dirt-oval racing became popular, the cars became more distinct. Custom chassis in which the batteries were positioned on the left were commonplace, as were scratch-built, direct-drive transmissions—considered more efficient on dirt ovals. With these innovations, "serious" dirt-oval cars soon outclassed most converted off-road cars, and separate racing classes became necessary. Several manufacturers began to sell car kits that were designed as dirt-oval racers.

Boom!

One of the most recent (and successful) 2WD dirt-oval chassis—the Titan TXO—was designed by long-time racer Jim Dieter. Jim, who's one of the premier dirt-oval drivers in the country, has collaborated with Trinity* to refine the Titan and create the ReFlex 10—a car designed to race *only* on dirt ovals.

FLEX FEATURES

The ReFlex 10's four fully independent, machined-Delrin A-arms are bolted to a graphite chassis plate that has a graphite upper brace for rigidity. The front arm mounts provide about 15 degrees of caster, while those in the rear provide 0 degrees. The front axles, spindles and

mount is threaded into the rear arm, and you adjust the toe-in by screwing it in or out. The car also comes with a set of fully ball-bearing-supported bellcranks and a set of titanium tie rods for the steering rods and the upper suspension-arm camber adjustments—front and rear. It seems as if this kit comes with *all* the good stuff!

Dirt-oval cars don't usually have much suspension travel, because 90 percent of the tracks on which they run are very smooth. (This is also why dirt-oval drivers consider foam or capped tires "hot tickets"; you wouldn't dream of using such tires on bumpy, off-road tracks.) Because the ReFlex only needs about 1/2 inch of

travel, it has four special, miniature, pressurized shocks mounted to its graphite shock towers. Don't let the size of these light shocks fool you; owing to their pressurization, they provide ample damping!

Dirt infiltration is a problem with many direct-drive dirt oval cars. On the ReFlex 10, it's solved by encasing the entire transmission assembly in two graphite plates (one of which is the motor-mounting plate) and a nylon housing. The easy-to-adjust differential consists of Schumacher Cat pieces and special, aluminum, diff-pressure plates that sandwich a Magic Motorsports 48-pitch spur gear. To tighten the diff, just

EX T10

hub carriers are from Robinson Racing Product's 18-degree inclined kingpin set. These units angle the steering spindle's pivot axis inward by 18 degrees, and this provides optimum camber for fast cornering.

In the rear, there's a unique toe-in/out adjustment setup. The outer, forward hinge-pin



SPECIFICATIONS

Manufacturer Trinity
Type Dirt-oval
Scale 1/10
Price \$399

DIMENSIONS:

Overall Length 18.25 inches
Width 9.5 inches
Wheelbase 11.125 inches
Front track 8.125 inches
Rear track 7.75 inches

WEIGHT:

Gross (with body and battery) 3 pounds,
6.07 ounces

BODY:

Type Dirt-oval wedge*
Material Polycarbonate

CHASSIS:

Type Pan
Material Graphite

DRIVE TRAIN:

Primary Gear
Transmission Direct drive
Differential Ball
Bearings/Bushings Ball bearings

SUSPENSION:

F/R: Type ... Single A-arm/upper control link
Damping Pressurized
oil-filled shocks

WHEELS:

Front: Type One-piece composite
Dimensions (DxW) 2x1 inches
Rear: Type One-piece composite
Dimensions (DxW) 2x1.5 inches

TIRES:

Front/Rear Yellow-compound foam

ELECTRICS:

Motor 05/540*
Battery 6- or 7-cell saddle pack*
Speed controller Electronic speed controller*

OPTIONS AS TESTED:

Tekin 411G ESC and TFM 27 mini receiver;
Trinity pushed 7-cell Sanyo SCRC pack and
12-turn, triple-wind Speed Metal motor; Futaba
S-132H servo; Parma Hot Wrap antenna
mount; Airtronics Caliber 3P transmitter.

COMMENTS:

The ReFlex 10 is truly an out-of-the-box race car. With such kit-supplied parts as titanium turnbuckle linkages and ball-bearing steering bellcranks, after-market items become a thing of the past. To make assembly easier (especially for beginners), Trinity should refine the instructions slightly. If, however, you pay attention to detail while building the ReFlex 10, you're sure to have a winner on your hands.

* not included

REFLEX 10

insert a slotted screwdriver blade into the head of the diff-adjustment screw on the car's right side and rotate the opposite wheel rearward; to loosen it, rotate the wheel forward. Team Losi universal-joint slider-shafts, rear hub carriers and axles round out the ReFlex 10's drive line.

ASSEMBLY REFLEX

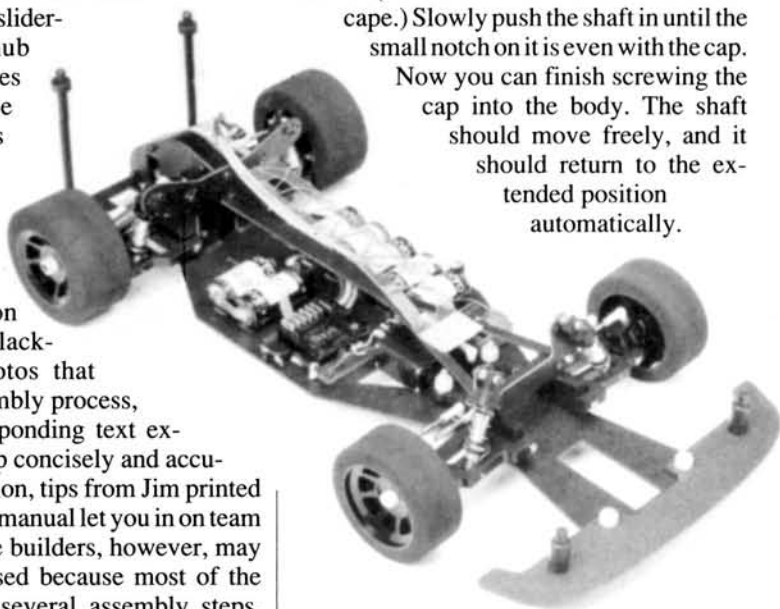
The instruction manual has black-and-white photos that detail the assembly process, and the corresponding text explains each step concisely and accurately. In addition, tips from Jim printed throughout the manual let you in on team secrets. Novice builders, however, may become confused because most of the photos depict several assembly steps, and there aren't many exploded-view detail shots. (I'd like to see a few more photos to accompany the text.)

The most difficult step is assembling the shocks. Designed to provide the damping of larger shocks with greater hydraulic capabilities, the small, pressurized shocks take time and patience to assemble properly. Spending the time here, however, will pay off at the track!

The secret is in the bleeding. After you've assembled the shafts/pistons, O-rings and washers in the correct sequence, pour the recommended 30WT oil into the body until it reaches the

threaded section. Then, insert the shaft and the piston into the body, followed by the cap. The trick is to screw the cap onto the body so that its threads *just* catch—no more! (This allows the excess oil to escape.) Slowly push the shaft in until the small notch on it is even with the cap.

Now you can finish screwing the cap into the body. The shaft should move freely, and it should return to the extended position automatically.



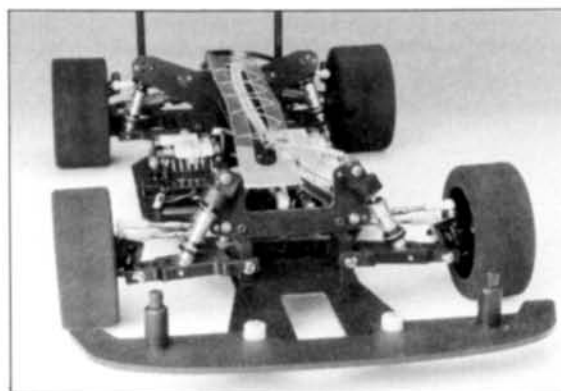
The ReFlex 10 is Trinity's foray into car manufacturing. It's a straightforward kit with many innovative features—a good car with which to get involved in dirt-oval racing!

It's critical that you build all the shocks at once so that you can ensure that each is pressurized equally. If you don't bleed them correctly, each one will provide a different amount of damping, and this will really mess up your car's handling!

The transmission is easy to assemble. Just be sure that the head of the diff-adjustment screw ends up on the car's right-hand side. The direction in which the diff rotates when the car operates prevents centrifugal force from loosening the diff. Building the diff with the screw head on the other side may cause the diff to loosen.

Although it isn't suggested in the instructions, I recommend that you carefully file the edges of the battery slots. This will improve performance by lowering the car's center of gravity, and it will prevent the graphite chassis' sharp edges from cutting the cells' shrink-wrap and causing shorts.

The suspension-arm hinge pins may be too long. To keep them from "floating," put the



A four-wheel, fully independent suspension with small, pressurized shocks provides the ReFlex with excellent damping. The large bumper protects the front suspension and prevents the body from taking the brunt of the impact during a collision.

REFLEX 10

supplied nylon spacers between the suspension arm and the hinge pin's retaining E-clip. Use as many spacers as necessary to take up the slack, but not too many. There should be some play, or the suspension arms will bind.

If you've never built a car or truck that uses universal-type slider shafts, you may find it hard to assemble the U-joint pivots. Each must have a roll pin pressed into it, and this can be frustrating if you don't have the right tools. You should use a vise to press in the roll pins, but if you don't have one, a good set of pliers will work. To make "starting" the roll pin easier, slightly ream the edge of the hole into which it will be inserted. Once the roll pin has been pressed into place, be sure that it extends the same amount on both sides of the "T." (Thorpe

Mfg.* makes a small, clamp-like tool that's designed to press such pins into place. It may be worth your while to pick one up.)

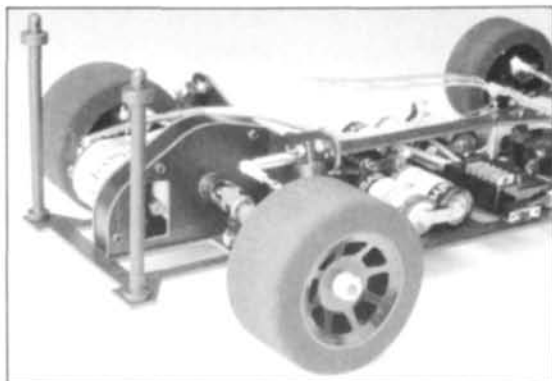
GEARING THE FLEX

Few R/C race cars can lay the power to the ground as dramatically as dirt-oval cars.

Naturally, I wanted a motor/battery combo that would wring the most performance out of the ReFlex, so I called Uncle Ernie and asked him to send me some of his best stuff. Trinity luckily had some of Sanyo's newest 1700mAh SCRC cells in stock, and they were pushed cells at that! I installed seven of them (five on the left side of the car and two on the right) and "hard-wired" them

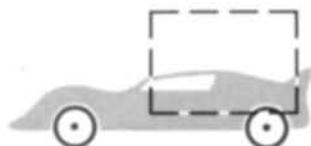
into place.

Dirt-oval racers generally use modified motors with very few turns. Those in the 10- to 14-turn range seem to be the norm, so I took the middle road and bolted in a Trinity 12-turn, triple-wind Speed Metal. This motor has worked well in my Kyosho Lazer with six cells, so I was curious to see how it would perform with seven.



To keep out dirt and debris, the diff assembly is sandwiched between two graphite plates that are connected by a nylon housing. Motor-mounting screws are accessible through a large, rectangular opening that's covered with tape to seal the tranny.

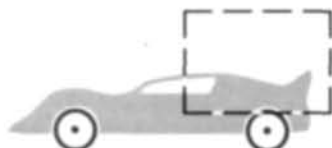
OVAL AIR CONTROL



1. The dotted line represents the Lexan side dam in neutral position.



2. Here, the side dam is moved forward of the body's center line to give it more steering.



3. In this illustration, the side dam is moved back for less steering.



4. The leading edge of the side dam has been moved back. This has the same effect as moving the side dam back.

A large side dam and a spoiler are two parts that are vital to a full-bodied, dirt-oval car's handling. The theory behind the placement of the side dam is that the closer its leading edge (front) is to the front wheel, the more steering or turning the car will have.

If you're racing on a long track with wide, sweeping turns and the wing is too far forward, the car will spin out. Conversely, if the track is short with tight turns, you'll need all the help you can get from the side dam; this means moving it forward.

At first, it's difficult to tell exactly where you should put the side dam, but it's best to start by positioning the leading edge about halfway between the front and rear wheels.

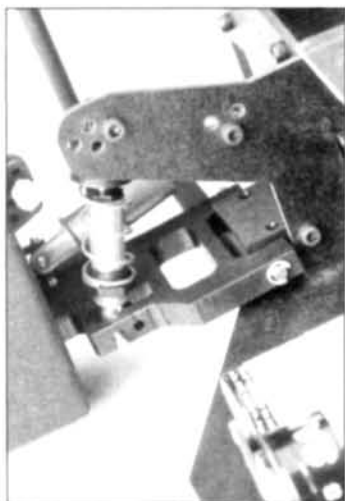
Don't worry about its length or how far it hangs off the back of the body, because this doesn't seem to make much difference. If your car tries to spin out, move the side dam back a little. If the car's steering isn't responsive enough, move the side dam forward. This is really an experimentation process but, with the basics, you'll know which way to go.

The rear spoiler has a major effect on the car's handling, but it's much easier to deal with than the side dam. The spoiler controls how the car enters and exits a turn, while the side dam affects the car when it's actually in a turn. The larger the spoiler, the more push or understeer the car will experience. If, when going into the turn, you have to let off the throttle to prevent

the car from "pushing" toward the outside of the track, your spoiler is too large. On the other hand, if the car spins out, is loose, or oversteers, increase the size of the spoiler. As a rule, start with a 1-inch-wide spoiler and work from there.

ROAR rules limit the side dam to a length of 14 inches and a height of 5 1/2 inches. The spoiler can't be more than 1 1/2 inches wide (this applies to molded-in spoilers, too). To figure out the length and the proper position of the side dam and spoiler, you'll have to spend some time at the track. Have a variety of side dams and spoilers ready so that you can try different combinations; otherwise, you might cut a side dam down too much, and you won't be able to use it at all.

I had a Tekin* 411G left over from a previous project, so my ESC needs were taken care of. The only receiver I had for my Airtronics* Caliber transmitter, however, was seeing action in another vehicle. I don't like to switch radio components from one car to the next, so I invested in Tekin's new TFM 27 FM mini receiver. It's about the same size as Tekin's AM receiver, so it's much smaller and lighter than the one that came with my Caliber.



The machined-Delrin suspension arms on all four corners combined with the graphite shock towers provide many shock-mounting positions, and this enables you to tune the ReFlex to a particular track.

FLEXIN' A BODY

One of the advantages of cars with "full" bodies, i.e., those that cover all the wheels completely, is that there's so much more room to let your creativity flow. Whatever paint scheme you conceive will easily fit onto these "wedge-type" bodies. Trinity's new Cadillac Eldorado dirt-oval wedge is featured in the photos, and it was given its "colorific" coating by none other than Rich Muise of Motion Graphics*.

REFLEX ACTION

The first few laps were, to put it delicately, exciting! If I applied more than half throttle, the ReFlex 10 moved into my peripheral line of vision before I could move my eyes to follow it!

To get more bite on the hard-clay track, I sliced grooves in the rear tires. (See the sidebar.)

The car tended to "unload" its rear tires when I released the throttle, e.g., in the turns, and this forced the rear end to spin out. I've been told that this is caused by the tremendous amount of front down-force that the Trinity body has. To make

full use of this force, a rear spoiler is a must. To prevent this off-power oversteering, I positioned the tops of the rear shocks inward slightly to "soften" the rear end. This allows the chassis to roll more—so it slides less—when it enters turns. I also installed Trinity's front sway-bar kit (part no. R7766). Although it reduces the amount of steering, it makes the car more stable entering turns. (You can also tune a dirt-oval car by repositioning its side dam. See the sidebar.) With these changes, the car was much easier to drive—especially in the turns.

It's important to make your car as stable as possible. A fast car isn't worth very much if it comes "unglued" the instant it hits another car. (And believe me, "rubbing doors" is a common occurrence in dirt-oval racing!) Also, it's best to make only one modification at a time so that you can determine the effectiveness of each.

Back on the track (which was occupied by several other cars), I noticed that I could really punch the ReFlex much harder out of



Mounted to the ReFlex 10's double-decker graphite chassis is Tekin's new 3-channel FM mini receiver. Trinity's new pushed Sanyo 1700mAh SCRC cells provide the voltage of SCRs and the run times of SCEs.

the turns than I could before. I'm not an expert dirt-oval driver, and I won't say that I dusted all the other cars. Through the turns, though, I did stay with all but one of them, and it was equipped with silicone tires that allowed the car to carry more speed on this track. With the SCRC batteries and Speed Metal motor, I made every-one duck on the straights—ballistic!

WATER ROCKET



THE MOST POWERFUL WATER CANNON EVER MADE!



For cool fun during the hot summer months, it's the ultimate water cannon from JPS, the Water Rocket! It can fire a stream of water over 60 feet in the air! Don't get soaked by less powerful water guns... get the Water Rocket from JPS!

DEALER AND DISTRIBUTOR INQUIRIES INVITED
P.O. Box 3014, Fullerton, CA 92634
(714) 738-1912 FAX: 738-0829

Money Back



GUARANTEE

BATTERIES YOU CAN TRUST

HOLESHOT Technology of Atlanta

is proud to offer our customers the finest quality in competition rated cells. These cell come with an unconditional 30 day money back guarantee! If for any reason your not 100% satisfied with your purchase just send them back and your money will be refunded. We'll even take them back with the Braid and Solder still attached!

Each cell is cycled a minimum of ten runs by proven methods using the latest technology in test equipment then labeled, shrink wrapped and matched with the following information.

Sorry no sponsorship

RUN TIME (SECONDS)	297 1.14	AVERAGE VOLTAGE
DISCHARGE RATE	6.0 20 26	IMPEDANCE
CHARGE RATE	1207 1.62	PEAK VOLTAGE
CHARGE TIME	.90 5000	DISCHARGE END TIME
CUT OFF VOLTAGE	HOLESHOT	THE MARK OF HONESTY!

"Typical SCR 1400 label"

SANYO SCR1400 / 20 amp discharge

6 cell stick pack w/connectors	\$25.00
6 cell unassembled sport	\$20.00
280 - 289	\$35.00
290 - 299	\$50.00
300 - 310	\$90.00

Matched Enduro stick packs **HOLESHOT** \$28.00

PANASONIC P170 1700 SCR / 20 amp

340 - 349	\$40.00
350 - 359	\$50.00
360 - 369	\$60.00
370 - 379	\$70.00
380 plus	\$85.00

SANYO 1700 SCR/RC ARE HERE!

call for pricing and technical data

R.C.K. carries a huge inventory of:

BOLINK-CAM-TRC-TRINITY-STRIKE FORCE
ASSOCIATED-LOST-TEKIN-NOVAK-ETA-BAD
DOG PERFORMANCE PRODUCTS-C&M COBRA
and more. CALL FOR THE LOWEST PRICES



Call for **FREE** demo
disk and information
packet

This months special is the computer driven RSR motor Dyno. Plugs into any PC compatible with a serial port. Very user friendly. The ultimate device in motor analyzing. A must for the serious racer. **\$495.00**

Radio Control Kar

404-297-4340

Mon. - Fri. - 11:00AM - 7:00PM EST

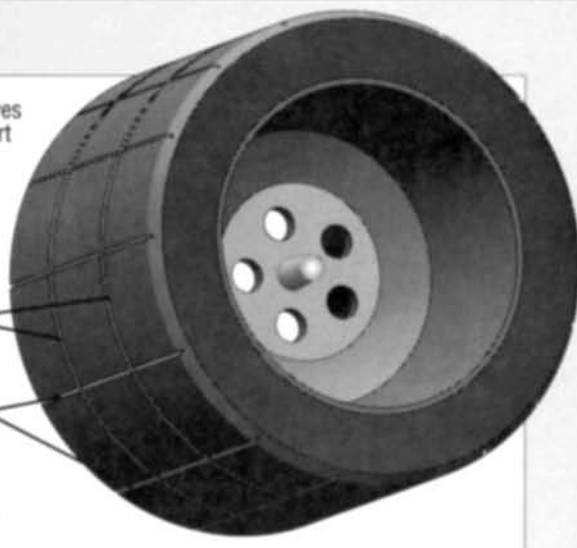
REFLEX 10

By slicing grooves in foam tires, dirt is displaced (keeping the tire clean), and traction is improved.

In-line grooves

Cross-cut grooves

Cut grooves no deeper than 1/16".



IN THE GROOVE

On early dirt-oval cars, racers used the same semi-pneumatic rubber tires that were used on off-road cars. When dirt-oval tracks became smoother, racers discovered that foam tires provided better traction than conventional off-road tires. They also discovered, however, that foam tires become coated with dirt, and this causes a hydroplaning effect similar to that experienced by full-size cars on wet roads.

To prevent dirt from building up and to improve traction by providing more tire edge, racers often cut into the rear tires. Cutting two 1/16-inch-deep grooves around the tire increases sideways bite and forces the dirt to be "channeled" out. (Some racers do this to the front tires, too.) Making crosscuts every 1/2 inch or so increases the tire's forward bite.

It's easier to cut the long grooves when the tires are mounted on a car that's running. Raise the chassis so that the rear tires don't touch the ground, and adjust the speed controller so that the motor operates at about half throttle. With an X-Acto knife or a razor blade, score two grooves into each tire while it rotates. (Don't cut more than 1/16 inch deep!) If the pressure of the knife prevents the tire from rotating, lock the diff or hold the other tire while you cut.

To make the crosscuts, turn off the car and draw the knife across the tire, perpendicular to the grooves.

AND IN SUMMARY...

The ReFlex 10 is Trinity's first car, and I think it's a winner. It didn't take me long to get accustomed to tuning this car, and the fully enclosed transmission prevents the need for constant maintenance. I do think that the instructions need to be refined; not everyone is an expert builder. Still, for a full-blown racing machine, it's fairly easy to assemble. You just have to pay attention to detail. By including parts from other manufacturers, Trinity has kept the price of the kit down. (This also makes replacement parts easy to find.)

Dirt-oval racing is rapidly gaining popularity, and the ReFlex 10 is an excellent way to get involved.

*Here are the addresses of the companies mentioned in this article:

Trinity Products Inc., 1901 E. Linden Ave. #8, Linden, NJ 07036.

Thorpe Manufacturing, 4054 E. Mission Blvd., Pomona, CA 91766.

Tekin Electronics, 970 Calle Negocio, San Clemente, CA 92672.

Airtronics Inc., 11 Autry, Irvine, CA 92718.

Motion Graphics, 2645 Robert Arthur Rd., Westminster, MD 21158.

Family Racing

by MIKE HICKS

PSSST...HEY, KID. Take this article, and shove it under your Dad's nose. Make a copy, and tack it to the fridge for you mom (or stick it in her briefcase or under her car phone!) It's time we got the message through to them: if you ain't racin', you ain't livin'!

Ahem. OK, here we go.

Dear Parental Unit:

It's the opinion of this writer and this magazine (to the extent that it's legally safe) that you may be suffering from a dreaded new disease—RCPWS (Radio-Control Parent Wimp Syndrome). This disturbing ailment has swept through North America and reached epidemic proportions. Its chief symptoms are apathy, lack of involvement and the ungrounded fear that a radio transmitter will be thrust into your hand and will make you look like an idiot.

RCPWS sufferers are known to say such things as: "Oh, I just don't have

the hand/eye coordination to do that..." (hmmm—seems to me that you can hit golf balls pretty well), or "Racing's just for guys..." (don't let world drag-racing champ Shirley Muldowney hear you say that, mom). Those afflicted by RCPWS are simply misguided people who lack the proper perspective.

Consider this: when our children are toddlers, we play with

them—winding their wind-up toys and stacking their "stackables"—for hours on end. Later, we teach them how to throw and catch baseballs and send them off to play in a league with kids their own age. We eventually teach them how to drive a car and then sit at home, trying to look calm, while they take it out to...who knows where, really?

As we give our children independence, we lose them—a little at a time—and we hope like crazy that they stay away from drugs and the "bad crowd."

But imagine a situation in which you stand shoulder to shoulder with your kids—whether they're eight or 28—and compete as equals while sharing the ups and downs of an exciting sport. Imagine, moms and dads, an activity that can only be classified as a terrific learning experience; one that will draw you and your son or daughter closer together.



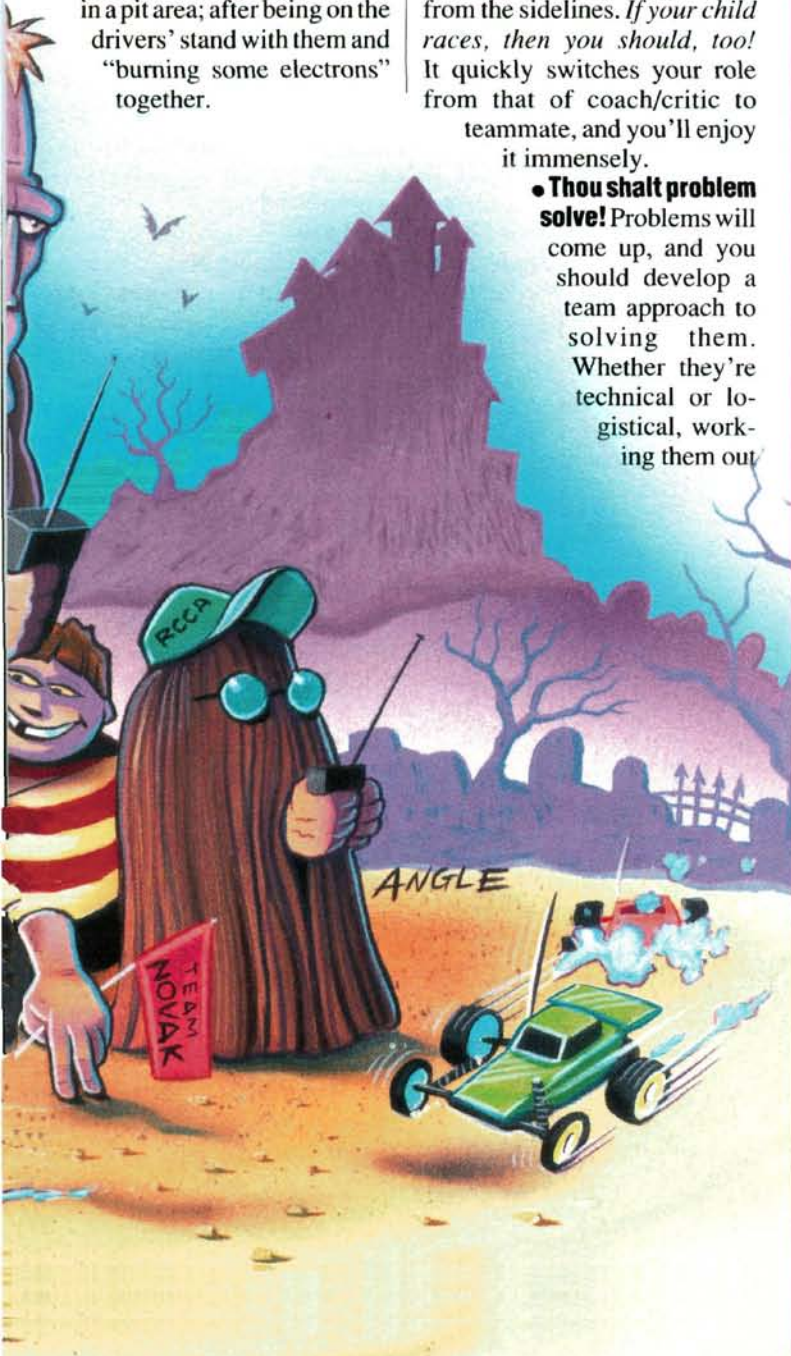
Imagine an activity that's a lot of fun, yet teaches such things as patience, persistence, manners, dedication and the ability to stay calm under pressure—the qualities that make people good managers, workers and parents. Your sons and daughters can carry the lessons they learn in this sport with them into adulthood.

I guarantee that you'll look at your good kids—and your relationships with them—differently after working with them in a pit area; after being on the drivers' stand with them and "burning some electrons" together.

Anyone who has been around R/C racing for a while has seen how some parents can ruin the experience for their kids (and themselves) by breaking what I call "The Ten Commandments of R/C," or the "Cardinal Rules of Family Racing." I've listed them here so that you won't make the same mistakes as those who've gone before you.

• **Thou shalt race!** You shouldn't just drop your kids off and pick them up, or bank-roll their projects, or watch from the sidelines. *If your child races, then you should, too!* It quickly switches your role from that of coach/critic to teammate, and you'll enjoy it immensely.

• **Thou shalt problem solve!** Problems will come up, and you should develop a team approach to solving them. Whether they're technical or logistical, working them out



DON'T PLUNGE!

Remember that diving into things rarely works. There's a proper way to get into R/C racing. Try this simple, six-step approach:

- Before you do anything, attend a few events. You can learn a lot by watching the pit crews, racers and marshalls. Observe how others cope: a little organization can make a big difference in the stress department.

- You'll need to develop a sense of rhythm and pace. Learn about the length of time between heats and the duties you'll have to perform. You should also become familiar with the season's race schedule.

- Find a hobby shop with a friendly, knowledgeable staff. If there are several shops in your area, try them all. A convenient location and hours that will fit your schedule are also important considerations.

- Establish a realistic racing budget. Determine what you really need, and then plan your purchases so that they fit your budget. Although you'll eventually need two of everything, you won't need it all right away.

Many of the tools you already own are appropriate for an R/C toolbox. As a beginner, the latest, greatest gear will do virtually nothing for your lap times or the reliability of your car. Forget the hot-wind motors; a high-quality peak charger or extra battery packs are what you really need.

- Read up! There are several terrific books and videos on everything from the basics to how to wring the most out of a race-ready R/C weapon.

- Test the water. Everyone involved should help to build your race car. The more you know about how it's assembled, the stronger your maintenance and set-up skills will be.

Practice is fun. Use a stopwatch and compare one another's times. Take rough timings on your runs to learn about battery life and to get a sense of what 4-, 6- and 8-minute races are like. Join a local club and/or ROAR. Such organizations offer plenty of advantages.

Set realistic goals. The first time I drove in a 1/12-scale race, my only goal was to make one lap—one! When I made 15, I was ecstatic. Now I'm trying to move from the low 30s to the low 40s—but I've given myself two years to do it. Get it?

- Pack your bags and get out of town! You can learn a lot by racing in strange territory with new folks. Most clubs are delighted to have visiting racers participate in their regular racing events, and you'll soon develop a network of R/C racing friends.

You can also learn a lot by visiting different hobby shops while you're on a business trip or a vacation. This can, of course, change the age-old cry of "What did you bring me, Mom?" to "Did you have enough time during your conference to get us a set of those new high-tech Q47/ZBX thrust-eliminator cones, Mom?"

Finally, do what you can to better the sport. There are many fine people involved in it, and you can gain a lot from the entire experience. Good luck, and good racing!

LUNSFORD TITANIUM ALLOY

Racing

NEW TITANIUM SHOCK SHAFTS

- Just released for Losi and Associated Shock in all Popular sizes. Precision ground 6-4 Titanium Shaft Polished to a killer finish. Reduce that Unsprung Weight

TITANIUM TURNBUCKLES

12 Different Kits to fit most popular Race Cars. "We have three RC 10 Kits alone." Lunsford Racing also sells convenient Two Piece Kits from 1.1/8 - 2.5/8 for on road or Special Applications.

TITANIUM PINS

Precision ground and polished to perfection. Just the thing for a Race Car on a Diet.

619 First Ave. East Albany, Oregon 97321 (503) 928-0587

Be a Professional Pilot!



SHIELDS AVIATION has more graduates with Major Carriers than any other accelerated flight school! Complete 6 month Professional Pilot Program plus housing and job assistance for \$24,900! FAA, VA and State approved. College credit available. No previous experience required. Send a photo with your "Model" and save \$1000.

Call 800-MAGIC 57 and come to Florida!



ROCKET CITY SPECIALTIES

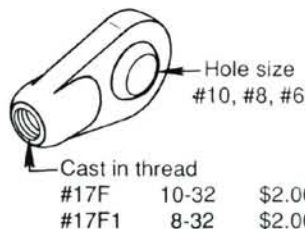


NEW

11/32 BALL LINK

Fits many 1/4" scale cars

#17 Right \$2.50
#17L Left \$2.90



#17F 10-32 \$2.00
#17F1 8-32 \$2.00



Catalog

See your DEALER or order direct
ADD .60¢ for postage and handling.
Catalog sent postpaid.

103 Wholesale Avenue N.E.
Huntsville, Alabama 35811
Phone 205/539-8358

FAMILY

together has advantages that go far beyond the moment.

• **Thou shalt share expenses!** You have to establish a budget. Racing involves more than just throwing money at technical problems when they arise. There are some on-going expenses—expenses that should come from paper-route money as well as mom and dad's paychecks.

• **Honor thy pit area!** Your pit area is like an operating room, and you and your child are a surgical team. Find a way to make organization, tidiness and teamwork "business as usual." This can quickly spill over into other parts of life.

• **Thou shalt support one another!**

Enjoy the little successes, and be complimentary to—rather than critical of—one another, because the successes will become bigger as time goes by.

• **Thou shalt have a "big time"!** Have fun, even if you're both being attacked by the glitch demons from hell! Smile at adversity and cheer on your neighbors.

• **Thou shalt get help!** It takes time to learn all the tricks of the trade, but the R/C racing "culture" encourages sharing information. Use the experienced racers around you as consultants. They'll be happy to help.

• **Thou shalt give help!** Help the folks around you. It's an age-old—but highly applicable—piece of advice that always pays off. The person to whom you lend an Allen key may be the one who saves you when you drop a bearing on the floor 30 seconds before your Main.

• **Honor thy organization!** Get involved with your club. Volunteer work is good for the soul, and that's a valuable lesson to pass on to your child. It's also a way for you to become an instrument of change rather than a complainer.

• **Thou shalt not be a dodo!** Make a commitment to learn the tech side of the sport—together. Read a lot of books, and ask a lot of questions.

These rules may seem simple, but they're absolutely valid. I see the entire spectrum of human behavior at every local, regional, or national event I attend. The people who succeed over and over aren't those who huff and puff, complain and fight; they're the ones who smile and help.

Those who fight and don't listen to one another, or whose parents push them around with sponsorship stars in their eyes are generally doomed. The unhappiness and

RACING

pressure can disrupt concentration on the drivers' stand and ruin performance in the pits. Conversely, kids who scream at their folks when a car breaks down or a tire falls off have also missed the point.

I use my people-watching skills a lot when I work as a volunteer tech inspector at the 1/12-Scale Cleveland Nats. The racers who are the friendliest, the calmest and the easiest to deal with include people such as Neisinger, Johnson, Ireland, Doseck and Hohwart. A winning attitude really does make a winning racer.

Parent-and-kid teams abound in every level in our sport—Gil Losi Sr. and his son, Gil Losi Jr.; Jay Halsey and his father, Jim; and Wayne and Ralph Gerber. Power Push Batteries' Tony Carruba races, and his daughter Vicki makes him look, well, kinda slow.

Just like all these famous family racing teams, you'll have to learn some of the more mystical aspects of successful R/C parent-and-child racing; things like:

- how to teach a kid whose bedroom looks like the far side of the moon about the importance of spotless diff balls;
- how to handle race-day pit pressure and keep the Federal Family Violence Agencies out of the scenario;
- how to live with a child who has six laps on you and really should be sent to his or her room;
- how to solve the age-old cry, "I've got better qualifiers than you, so I get the good batteries for the Main";
- how to maintain grace under extraordinary circumstances, or
- how to smile at a race official and explain why you need a "mercy minute" because your child has glued his or her hand to the back of your left calf while swatting a mosquito;
- how to clear your mind of daily worries during races to avoid the infamous condition suffered by all grown-up racers: brain fade.

There are moments of agony and frustration in any sport, but that's what makes you stronger. Believe me—and the thousands of other parents who've teamed up with their kids—it's worth it. So, Parental Units, even if you're suffering from RCPWS today, tomorrow, you can be an RCP—Radio-Control Parent Champ! *Go for it!* ■

KILLER CLOD PARTS!

JPS HAS IT! Super-strong machined billet aluminum gearboxes are a direct replacement for the stock plastic components, and feature an adjustable motor mount for a wider range of gear ratios. The ultimate Clod accessory for full-pull strength!

JPS' Aluminum Clod rims are available for either standard tires or dually IMEX-style tires in over a dozen styles. And, check out our new aluminum bumpers, axle tubes, and ladder bars! For the Killer Clod- JPS HAS IT!



• MACHINED CLOD GEARBOX #7000

NEW!
STEEL GEARS
NOW
AVAILABLE!



• BILLET ALUMINUM AXLE TUBES AND LADDER BARS

MADE IN U.S.A.

JPS CUSTOM WHEELS

SOLD IN PAIRS

SEND \$2.00 FOR
CATALOG AND STICKER

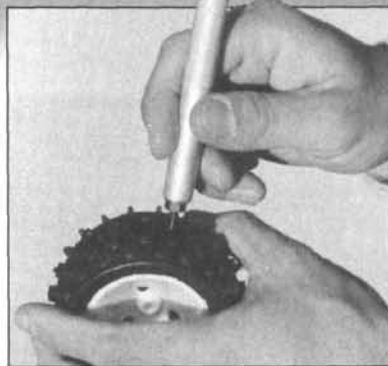
P.O. Box 3014, Dept. CA, Fullerton, CA 92634
(714) 738-1912 FAX: 738-0829



• SINGLE AND DUAL CLOD RIMS

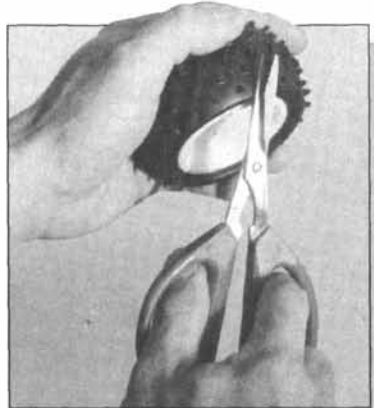
TIRE TUNERS!

If you look into the pits of top racers like Cliff Lett, Rick Howhart, Brian Kinwald and others, you'll notice some very nifty tools that allow them to tune their tires to track conditions. Now RCPS has made available these custom tire snippers and punches!



Tire-Tuner Snippers feature super-sharp, stainless steel blades with plastic-coated ergonomic handles. Their precise feel makes cutting X-patterns or snipping spiked tires a breeze!

Tire-Tuner Punch is the easy way to cut a clean, precise 1/8" hole in your tire for controlled tire compression. Varying the speed at which the tire compresses is another way to improve handling. An optional 3/16" tip is also available!



"High-Performance
Parts for High-
Performance Racers"



18312 Gifford St., Fountain Valley, CA 92708 • (714) 962-6928 FAX: (714) 962-4089

WHEN WE featured Joe Gaczol's "pocket racers" in the October '91 and April '92 issues of *Car Action*, we thought we had seen it all. Well, that was before we got our hands on one of the Pit Gear cars from Yonezawa* of Japan. We showed you a tiny Japanese R/C car in the "Scoop" a while back, but we couldn't find it—or anything like it—in the States. After searching in vain for months, I finally found one of these little suckers right under my nose.

I always breeze through the FAO Schwarz catalogue around Christmas time to see the cool new stuff that I would have wanted when I was younger. (Wow! A super-cool 500SL kiddie car that's gas-powered and comes with a 3-speed transmission, a clutch, rear disc brakes, rack-and-pinion steering...uh...\$7,000...maybe not!) Well, lo and behold, the Pit Gear car was on the

last page! Within minutes, I was on the phone, ordering the car (shipped overnight, of course).

YONEZAWA

PIT GEAR

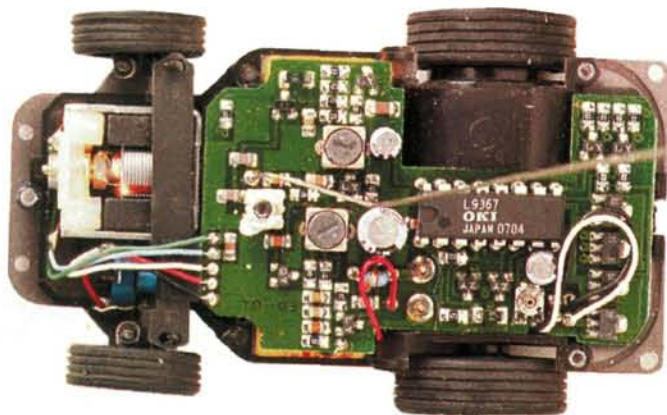
NIMBLE THIMBLE RACER

When I opened the box, I was very surprised. Inside was the smallest R/C car I'd ever seen, a transmitter, two bodies and three sets of hubcaps. The car comes with Ni-Cds, and yes, the transmitter is also a charger. To run the car, all you have to do is choose the body, mount the tires and the hubcaps and charge it. (You'll need eight AA batteries to power the transmitter/charger.)



by JOHN HUBER

PIT GEAR



After the batteries dump, just pick up the car and plug it into the transmitter/charger! Slide the switch with your thumb, and a small charging jack protrudes from the side of the transmitter. A blinking LED indicates charging.

As you can see here, the Pit Gear is a very compact little unit. All the electronics are on a single circuit board.



Check out the 1/52-scale Pit Gear next to a 1/10-scale F40. Although the Pit Gear model is very detailed, it looks "compressed" when compared with the 1/10-scale model or the full-size car.

INSIDE

Of course, I had to take the Pit Gear apart to see what makes it tick. The chassis is made of transparent plastic, and it houses the electronics and the gears. Be very careful if you take this car apart, because the components are very small, and they're arranged

very tightly in the chassis. The servo gears and the motor are completely exposed when you open the chassis case. The receiver, the ESC and the servo electronics are mounted on one printed circuit board. Four Sanyo* 50mAh cells (mounted under the circuit board) power the car for about 1 minute. This run time might seem short, but when you consider that you can recharge the car in 45 seconds with your transmitter, it's no big deal.

TINY TEST DRIVE

For this test drive, I didn't head for my local track; in fact, I didn't even go outside. A smooth surface is a must for this car, because the suspension is very

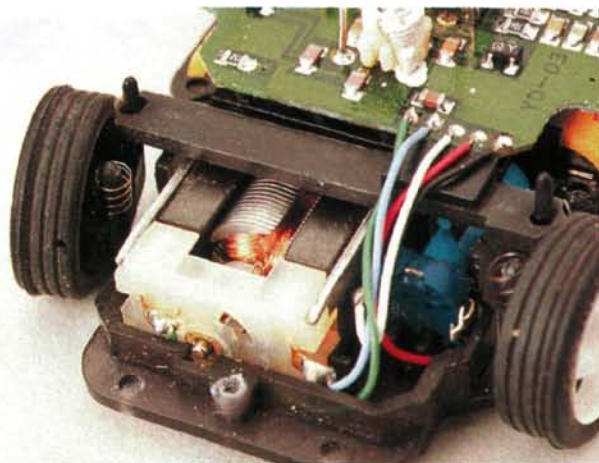
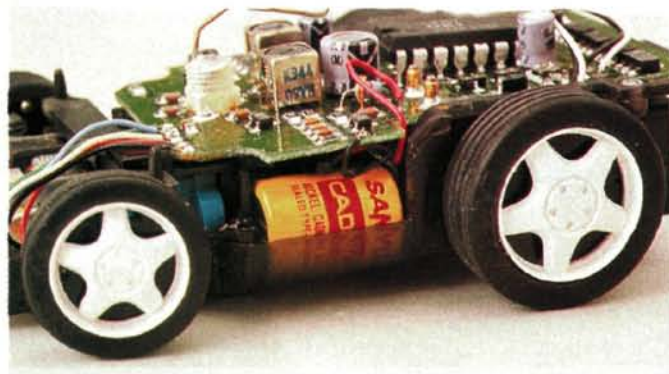
limited. It's so small that I could set up a good-sized course right in my kitchen. Despite its size, the Pit Gear really moves. I'd say it goes faster than someone jogging. Because its wheelbase and its track width are less than 2 inches, this little sucker is very nimble and tricky to drive. What truly amazed me was that this car has proportional steering and forward/reverse!

If you want to try something that's truly amazing, check out the Pit Gear. We've seen pictures of at least ten different bodies for them, although they might not all reach the USA. Be careful if you have a cat or a dog; they might mistake it for a snack!

**Here are the addresses of the companies mentioned in this article:*

Yonezawa; distributed by Impulse Inc., 8416 Xerxes Ave. N., Brookland Park, MN 55444.

Sanyo Electric, Battery Division, 200 Riser Rd., Little Ferry, NJ 07643.



This tiny motor is part of the steering servo. Also, notice the tiny coil springs on the front end.

Four Sanyo 50mAh cells power the Pit Gear. They provide about 1 minute of run time, but you can recharge them in 45 seconds.

NITRO NEWS

by JEFF BRONSTEIN

Suspension Shock?! Part II — Don't Get Pushy!

THE NITRO-BREATHING, 1/8-scale, R/C racing class has always been considered one of the fastest, most challenging classes to master. The intricate 2-stroke engines and full-suspension chassis are unparalleled in design and realism. The topic of this month's column should be of interest to anyone who wants to win races, but it should also make R/C driving a lot more fun, and that's what it's all about.

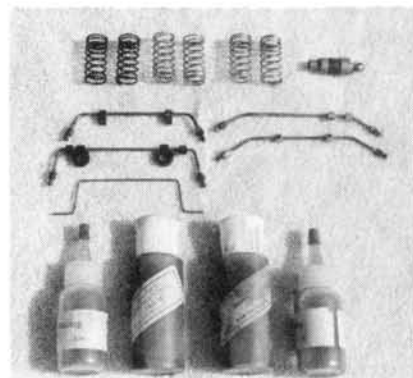
Every track poses particular obstacles for drivers and cars. By tuning its suspension, you can adapt your car to suit your driving style and local track. Your car should be tame enough to drive, but wild enough to leave the competition coughing in your dust. Although the perfect setup is virtually impossible to obtain, the right compromise can be the difference between making the winners' circle and chillin' out with the losers.

Last month, I described some of the basics of chassis design and suspension geometry. For the most part (ignoring aerodynamic forces), you want:

- the lowest possible overall weight;
- the lowest unsprung weight;
- the lowest center of gravity (CG);
- minimum rolling drag;
- maximum tire traction.

(See last month's column for details of these.)

Unfortunately, several of these qualities conflict, e.g., smaller tires reduce rolling drag, but they



Shock springs, oil viscosity and anti-roll devices help tailor a car's suspension to suit track conditions and driving style.

also reduce traction; lightening the chassis decreases overall weight, but it also raises the CG. In this respect, a good car design is just as important as the solid foundation of a building.

The same type of conflicts must be considered when tuning suspension. The ultimate goals are maximum acceleration, braking and cornering speed for a particular track and race. As I discussed in Part 1, weight transfer, ride height, caster,

(Continued on page 56)

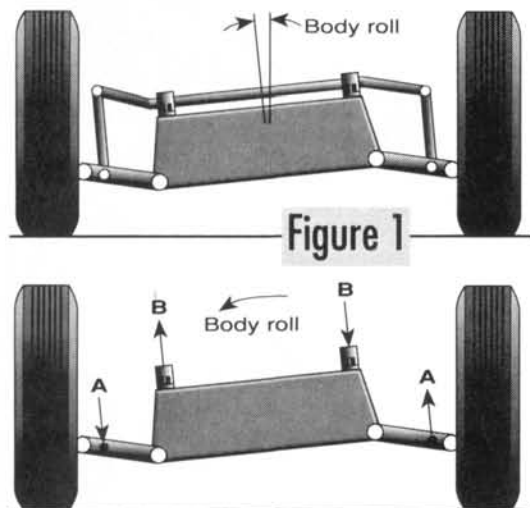


Figure 1

▲ The top drawing shows how an anti-roll bar is twisted when the body rolls in a turn. It's twisted at the four points where it's attached to the vehicle. The forces are shown in the bottom drawing. Force "A" on the suspension increases weight transfer to the outside tire. Force "B" on the frame resists body roll. The effect is a reduction of body roll and an increase in weight transfer at the end of the chassis that has the anti-roll bar. Because the total weight transfer caused by centrifugal force isn't changed, weight transfer at the other end of the chassis is reduced.

► This drawing shows a car rounding a right-hand corner. In this example, the rear-tire slip angles are greater than those of the front—a condition that causes oversteering. We're most concerned about the two outside tires, because in corners, they do most of the work.

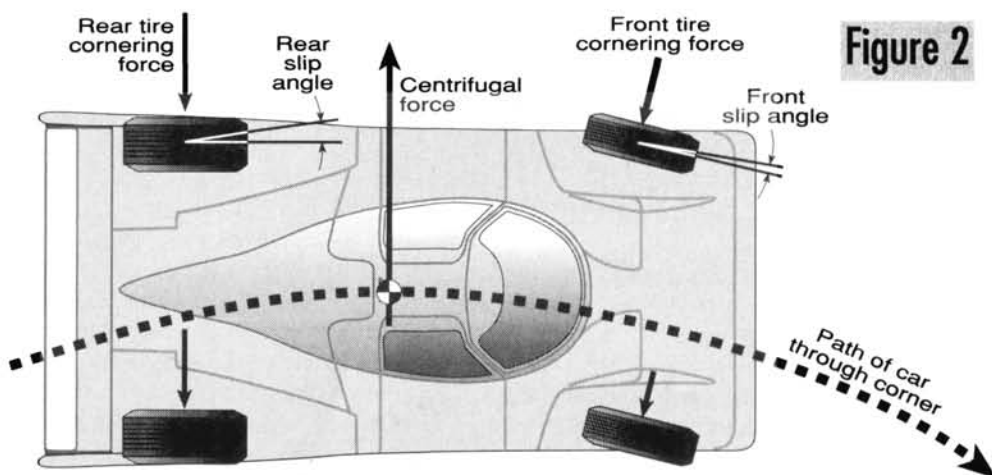


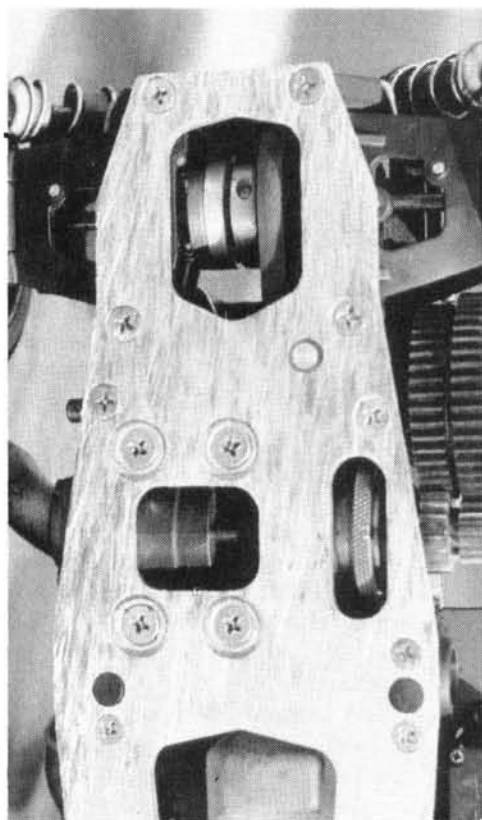
Figure 2

(Continued from page 55)

camber and toe-in and -out are important because they affect traction. To obtain good handling, you must compromise; you can't have maximum traction *and* maximum speed. A tire only has a certain amount of traction, which may be used for cornering, acceleration, braking, or a combination of these. If your car slides, you can be sure that you've demanded too much from your tire traction; it's time to tune your suspension to increase traction.

I'll concentrate on tuning for flat tracks because the bumps and ruts of off-road racing complicate the situation. The most difficult parts of an on-road track are generally the corners, where it's difficult to keep all four tires on the track because of the cornering force (or "centripetal"—center seeking—force). This force tries to make the car follow a path that's at an angle to the direction in which the wheels are pointing. This is called the "slip angle," and both the front and the rear tires will develop slip angles in turns. The path followed by the car will be determined by the direction in which the front tires are pointing and their slip angles. Because the cornering forces at front and rear may differ, the slip angles may also be different, and this will very much affect a car's overall performance.

● **Oversteer.** When the rear tires have greater slip angles than the fronts, your car will "oversteer." Oversteering is common with very light, very powerful cars, which might be referred to as "loose" or "tail happy." The car feels as if its rear



Notice the angle of the scrape marks on the rear of this Serpent chassis. They're the result of the slip angles developed by the rear tires as the car cornered.

feels unresponsive—heavy—and it won't corner well. Understeering is a "safe" condition because we tend to apply more steering as our cars go into corners.

Although oversteering is usually preferred in racing, to perform really well, a car must not exhibit a strong tendency either to understeer or to oversteer.

SUSPENSION AND SLIP ANGLE

You can tune your car's suspension to increase or decrease slip angle at the front or rear of your car. Decreasing the slip angle, thereby increasing traction, is referred to as "tightening the car up," and there are several ways to do it.

Having softer springs, or a less efficient anti-roll bar, will cause more tire to be in contact with the road. Softer or wider tires will give your car more "bite." Having slightly negative camber will give your car more "camber force" in the corners. It will keep more of the outside tires

in contact with the ground when cornering. Reducing positive caster slightly will increase cornering force.

But each adjustment has some side effects that may be bad for a car's overall performance. Using softer springs or

Dial-in FOR dollars

Here are some of the ways in which you can adjust your car's chassis and the effects each adjustment will have on its handling.

● **Roll stiffness** can be adjusted by adding a swaybar to the car's front and/or rear end or, if your car already has a swaybar, by removing it. You can also adjust roll stiffness by altering the damping and spring rate at each end. To make your car oversteer, stiffen the front (less roll), or make the rear less stiff (more roll). To make your car understeer, do the reverse.

● **Ride height.** The lowest possible ride height will maximize cornering response. If your car "traction rolls," lower its ride height.

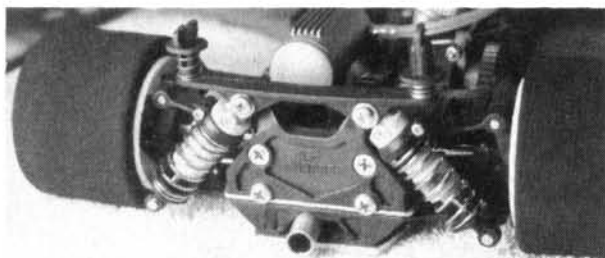
● **Caster adjustment** offers a tradeoff between cornering and stability. If your car's steering is "twitchy," increase front caster; if your car understeers, decrease front caster.

● **Camber.** For most cars, zero or slightly negative camber will give the best traction in most conditions. If you increase negative camber, steering will be more responsive (especially at higher speeds), but tire wear will be uneven. Reducing negative camber will slightly diminish high-speed steering response, but your tires will last longer.

● **Toe-in/out** adjustments offer a tradeoff between stability and rolling resistance. More toe-in increases straight-line stability and rolling resistance; less toe-in increases top speed and reduces straight-line stability.

● **Tire width.** Tire choice offers a tradeoff between traction and rolling resistance. Wider tires give more traction because they have a larger area in contact with the ground, but this contact creates more rolling resistance (friction with the track) and reduces the car's top speed.

● **Tire compound.** Harder tires will last longer than softer ones, but they have less traction. Softer tires have more traction and more rolling resistance.



Set ride height by adjusting the collar on the shock body. Don't use this collar to change spring tension.

end won't follow the front, and "spin-outs" are likely.

● **Understeer.** This is the opposite condition: the front tires have greater slip angles than the rear. A car that understeers is said to have "push" or "scrub." It

smaller anti-roll bars will make the car roll more in the corners, and this will increase weight transfer and hinder steering response. Using softer or wider tires will increase rolling resistance, wear your tires more quickly and hurt top speed. Always find a compromise that works best for the particular track.

If you have enough traction, it may be more appropriate to increase the slip angle at one end of the car. This is called "loosening the car up." To do this, do the opposite of what you did to "tighten" the car. Remember that a car in which there's little lateral weight transfer will corner faster than a car with a lot (all other factors being equal). The greater the weight transfer, the lower the traction. Thus, steering characteristics can be varied by increasing roll stiffness at one end of the car and/or reducing roll stiffness at the other end.

A car with "neutral steering" can be made to understeer or oversteer by using the throttle in certain ways. This is where all that neat stuff we talked about last month comes in! Make only one change at a time, and record the car's reactions to each change. Keep a log of track conditions, car setup and its performance characteristics. The more information you have, the more likely you'll be able to find the right setup for any particular track condition.

Look for consistency in a car's performance. Good handling is matter of balancing front and rear traction. The car should feel the same when it accelerates and brakes, and it should feel steady in the corners. The key is *consistency*. Experienced racers will recognize that the "perfect" setup is impossible to achieve because there are simply too many variables involved in running a single lap. That's what keeps this hobby/sport so exciting! Getting as close to perfect as possible is as much as anyone can expect.

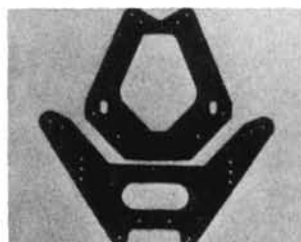
Always concentrate on your car's performance over the most difficult stretches of the track. To get a good line through these areas, you may have to sacrifice performance slightly, and good drivers often rely on their skill to get them quickly through these sections. Remember, no matter how well your car is prepared, there's still no substitute for staying calm and getting lots of practice. ■

Cheetah Racing

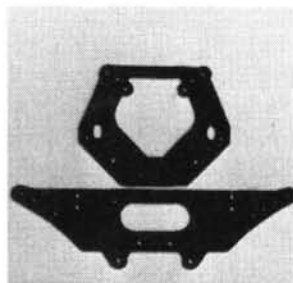
SUPERIOR DESIGNS - SUPERIOR PERFORMANCE

RC10T Graphite Replacement Shock Towers and RC10T Graphite Short Shock Towers for Oval Racing are now available from Cheetah Racing.

These Graphite Shock Towers are stronger and stiffer than original to better support the shock absorbers. Short Shock Towers lower truck center of gravity to increase handling at high speeds in Oval Racing.



OR-1 OR-2
ORG. TOWERS



OR-3 OR-4
SHORT TOWERS

They also provide you with three (3) different shock mounting positions on the Front Tower and four (4) positions on the Rear Tower. Short Front Shock Towers allow the use of truck bodies with flat hoods.

- OR-1... Replacement Shock Tower (Front)
- OR-2... Replacement Shock Tower (Rear)
- OR-3... Short Shock Tower (Front)
- OR-4... Short Shock Tower (Rear)

CHEETAH RACING, 10823 Amestoy Ave., Granada Hills, CA 91344 (818) 366-2683

QUICK TRACKSIDE BODY FIX

OFF ROAD — OVAL — ON ROAD

Instant Repair Kit

A Must For All Hobbyist and Racers...

- Patches Torn Bodies
- Race Ready In 15 Minutes
- Restores or Improves Original Body Aerodynamics
- Strengthens Body Weak Points
- Reinforce Fender and Body Post Areas

9000 - THUNDER REPAIR KIT (R/C CARS)

(Complete With Super Shock Cloth and Adhesive)

9050 - SUPER SHOCK CLOTH (4)

(For Thunder Repair Kit)

Contact Your Local Hobby Shop

T&A MACHINE

PRODUCTS

2286 Via Burton, Anaheim, CA 92806 (714) 758-0498

3 Easy Steps



Outline Patch Area



Apply a Thin Layer of Adhesive



Apply Super Shock Cloth and Smooth Out Let Dry. "Lets Go Racing"



**HOME-BUILT
PROJECT**



by JEFF SMITH

Nightstalker!

**SINISTER
MINISTER OF MONSTER
MADNESS!**

I BOUGHT a used Tamiya* Clod Buster that was already equipped with Trinity's* Monster Mash Motors and a bearing kit, and I decided to turn it into something different! I wanted a monster van with twin Parma* Hemi engines.

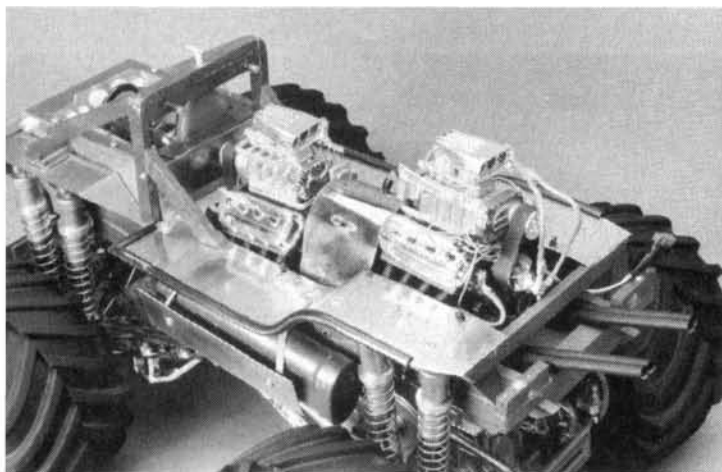
I found a Pro-Line* Van/Am GT body at a local hobby shop, and I decided to give it a try. (I knew I could easily install windows in the van body so I could show off the Hemis.) It was very important to me that the fender wells looked realistic, and that there wouldn't be wires showing or light shining through; I wanted a snug fit! After further inspection, I realized that if I narrowed the body and widened the chassis, they would fit together well.



PHOTOS BY YAMIL SUEO



"I USED A TEKIN 700 ESC WITH 12 CELLS AND THE TRUCK REALLY FLEW; IT ALSO EXPLODED THE FIRST TIME I ROLLED IT OVER!"



With the body removed, you can see the twin Hemi engines. Also notice the roll bars and the lighting system.

CHOP SHOP

Could I chop a Lexan body? Everyone I talked to said it couldn't be done, but I did it! I put a 7/8-inch-wide piece of masking tape down the center of the body (front to rear), then, I used Tamiya's Lexan scissors to cut along each edge of the tape carefully until I had two halves and a 7/8-inch-wide strip of Lexan.

I put the two halves back together, and used hot glue to attach the 7/8-inch strip over them. (The hot glue is important; you'll have to disassemble the body to paint it, and hot glue makes this easy.) I also supported the inside with scrap pieces of Lexan. It wasn't as strong as the original, but it looked more scale-like. I cut the front wheel wells out on the original lines, but I moved the rear wheel wells back about 3/4 inch so that they'd line up with the tires.

HEMI TIME

I knew that if I wanted to put two Hemis in the center of the chassis, I'd have to mount the DuraTrax* 1500mAh battery packs on the sides. I added lightweight aluminum sheet to make the chassis as wide as the body. I used rubber bands to mount the battery packs on the sides of the chassis, and I concealed the packs with aluminum plates. Up front, I had to shorten the stock chassis slightly. Then, I added a

scratch-built, balsa and aluminum roll bar, and I built front and rear bumpers that doubled as body mounts.

Before I went any further, I painted the chassis with white primer and covered it with Pactra's* metallic burgundy paint. I also painted the battery packs. Then, I installed the four shock-tower lights. I added a piece of stainless steel to each

lights, rewired them, and attached them to the front of the chassis. I also attached three small lights to the roll bar.

I painted the gearboxes with Testors* no. 1244 gold paint, and I painted the axle stays and the gearbox guards metallic burgundy. I used Custom Chrome's* ladder bars, suspension braces and rod ends, and I added Parma heat sinks and foam filters to the Trinity motors. Up front, I installed a custom brush guard.

I thought that if I eliminated rear steering, the truck could make high-speed turns without rolling over, so I tightened the 4x15mm shoulder screws at the top and bottom of each hub carrier. Then, I bent a rod, secured

painted metallic burgundy. I used eight Trinity Clod shocks, but I had to cut out the underside of the chassis in the front to allow clearance for their added travel.

Now it was time to paint the body. I took it apart and laid both sides flat on the table. My sister-in-law did the Nightstalker lettering in reverse on a piece of paper, and I taped it to the outside of both sides of the body. Then, I hand-painted the lettering from the inside with two coats of gold paint.

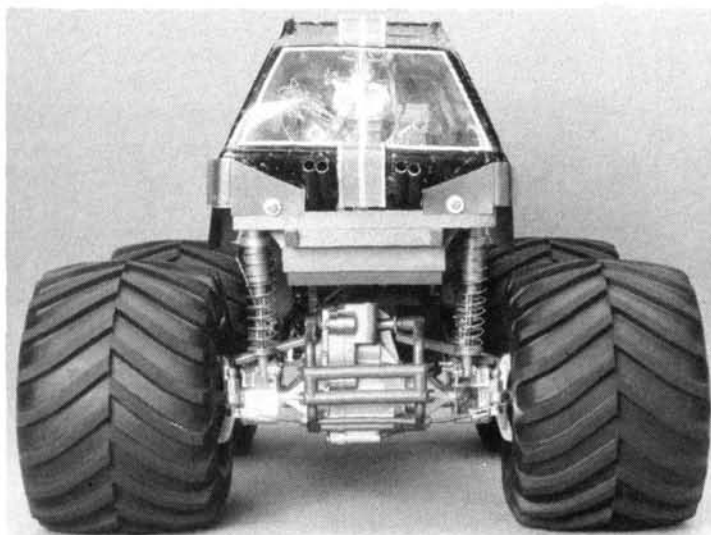
Next, I taped off the windows and the lower portion of the body. I dipped a small paintbrush in a jar of Pactra's R/C finish paint and flicked it over the exposed Lexan several times until I had achieved the desired effect. Then, I painted black over the same area, removed the tape from the lower section and painted it and the 7/8-inch-wide Lexan strip metallic burgundy. After this had dried, I reassembled the body.

Before I installed the two Hemis (which I had already detailed) in the chassis, I ran exhaust pipes out the back of the truck. I also ran another wire to the rear so that I could hook up two more lights on the van's rear ceiling. I shortened the Hemis' headers and installed them, and I also installed a tranny cover with two more lights. I had to cut out a piece of the roof in the back of the van to allow for the rear Hemi's intake. Then, I pinstriped the van.

POWER

I used a Tekin* 700 ESC with 12 cells and the truck really flew; it also exploded the first time I rolled it over! So, I in-

(Continued on page 90)



Four exhaust pipes protrude from the rear of the Nightstalker. If you look closely, you can see that the rear steering rod has been fastened to the chassis to eliminate rear steering.

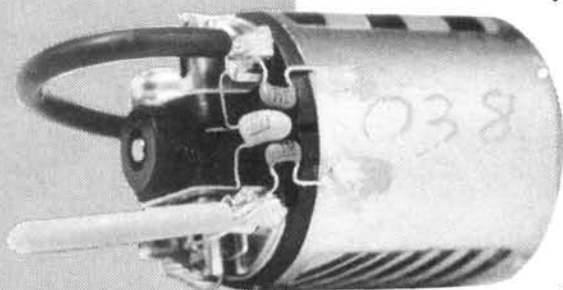
wheel well to help reflect the light (it also looks great when the lights are off!), and I added four red accent lights on each side of the Hemis. To make the headlights, I cut the front sections off two mini metal flash-

light through the gearbox guard and connected it to the original ball connectors on each side of the truck.

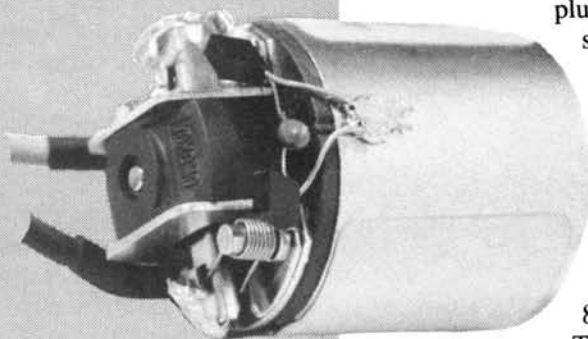
Next, I put the stock tires on Tecnacraft* wheels over home-made hub covers that I had

HOW TO INSTALL RADIO GEAR

Capacitors



Above: Notice the short capacitor leads and the smooth, clean, shiny solder. There's no excess solder here—good job!



These capacitor leads are too long. The capacitors should be on the same lugs as the power leads. The rough solder surface indicates that a low-wattage soldering iron was used. (Who did this anyway?)

by STAN VANDRUFF

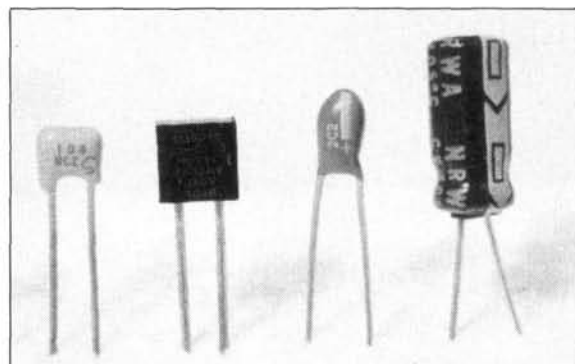
HAS YOUR R/C car ever wandered off the track in the middle of a race? Have you ever silently cursed someone in the pits because you were sure he turned on his transmitter just to interfere with yours? Well, the problem probably *was* interference, but you may have been the one to blame.

If you have an electronic speed controller (ESC), especially a new, high-frequency model, your motor can create enough radio-frequency (RF) noise to overwhelm

your receiver and cause glitching. This RF noise may also interfere with electronic lap counters and cheat you out of laps.

Your car's DC motor is very inductive so it draws a lot of current. Every time you start or stop the current flow through an inductor, there's a voltage spike (that's how 12 volts DC from your auto's battery is converted to 30,000 volts to fire the spark plug). A frame-rate ESC starts and stops the current 70 times each second; most high-frequency ESCs switch at 2,500 times each second. A low-impedance, high-frequency ESC might cause spikes of 80 to 100 volts.

These short spikes can cause radiation at frequencies far above the ESC's switching frequency. The shorter the spike, the higher the frequency; the higher the spike's voltage, the greater the power that's radiated. In extreme cases, this radiation can interfere with nearby stereos and TVs as well as the receiver in your R/C car.



Various capacitors (from left): epoxy-dipped ceramic, molded ceramic, epoxy-dipped tantalum, aluminum electrolytic. Notice the (+) sign on the tantalum and the (-) sign on the aluminum; they're polarized, so take care to solder them correctly.

PHOTOS BY STAN VANDRUFF

That's the bad news. The good news is that this interference is easy to eliminate using motor-filter capacitors.

CHOOSING A CAPACITOR

A capacitor is a dielectric (a nonconductor) that's sandwiched between two conductive plates. Capacitors are made of a variety of materials, but those most suitable for R/C cars are:

- ceramic—can withstand high voltage;
- tantalum—rugged; good for high-frequency applications;
- aluminum—high capacitance; small.

"...your motor can create enough radio-frequency (RF) noise to overwhelm your receiver and cause glitching....This interference is easy to eliminate using motor-filter capacitors."

Ceramic and tantalum capacitors are made by attaching conductive plates to each side of a block of ceramic or tantalum oxide, then sealing them with epoxy. An aluminum electrolytic capacitor consists of an electrolyte-soaked strip of paper that's sandwiched between two strips of aluminum foil that are then tightly coiled and inserted into an aluminum can.

Capacitors are rated by working voltage as well as capacitance, and you'll need a capacitor with a voltage rating higher than anticipated spikes, i.e., a 10V capacitor won't do, even though a battery pack only emits 7.2 or 8.4 volts.

It's best to use three capacitors on R/C car motors: one between each power lug and the motor can and one between the two power lugs. Which is the best type of capacitor? It's different for each motor/controller combination; the number of turns one motor has, the controller's impedance and the lengths of the wires that are used are all factors. One of the three following choices will suffice for most setups.

- Mechanical speed controllers don't switch quickly enough to cause much noise, but the brushes can make enough noise to cause trouble. If you have a mechanical speed controller, add a 0.1 microfarad 50V ceramic capacitor between the positive and negative power lugs.
- A 70Hz frame-rate ESC requires a 0.1 microfarad 50V ceramic capacitor between each lug and the motor can and

a 47 microfarad 25V aluminum electrolytic capacitor between the positive and negative lugs. (You don't need such a large capacitor between the lugs to suppress noise, but it helps to smooth out some of the jerkiness at low speeds.)

- High-frequency ESCs require a 0.1 microfarad 50V ceramic capacitor between each lug and the motor can and a 2.2 microfarad 25V tantalum capacitor between the lugs; 2.2 microfarad is almost the ideal size for noise suppression, and there's no jerkiness at any speed with a high-frequency controller.

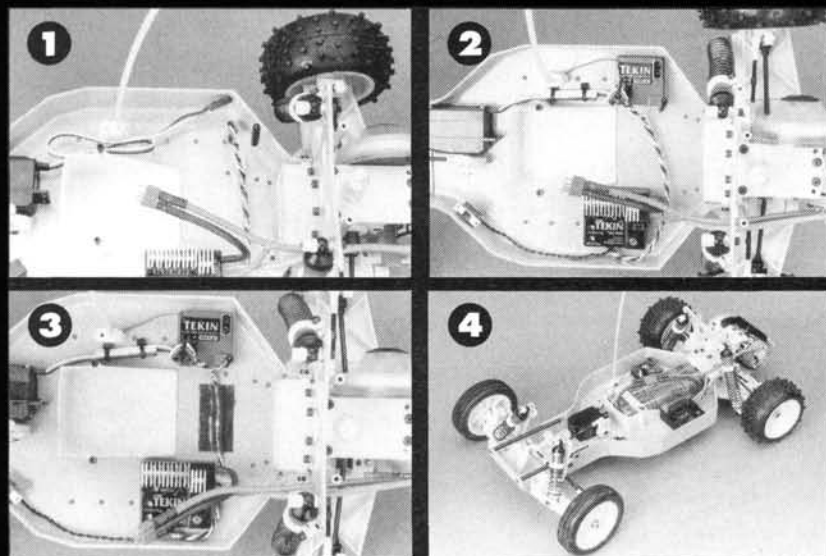
These capacitors may not be available at your R/C hobby shop, but you can buy them for less than 25¢ each at hobby outlets such as Jameco* or JDR Microdevices*.

RECEIVER MOUNTING

by FRANK MASI

AFTER YOU'VE installed the steering servo and the ESC in your car (see the two preceding installments of "How To Install Radio Gear" in the May and June issues of *Car Action*), you can mount the receiver and neatly route all of its wires so that they don't hinder performance. This is probably the easiest step in the process of radio-gear installation, but don't rush through it.

First, decide where to mount the receiver on the chassis. Ideally, you should place it as close to the car's antenna mount as possible (1). Also, make sure that all the necessary wires, i.e., the steering-servo and ESC leads, can reach the receiver ports from the location that you choose. Clean this area and the back of the receiver thoroughly using motor spray or some other solvent that won't harm plastics, and attach the receiver to the chassis using double-sided tape. As always, don't let the solvent touch your skin. (As you can see [2], the lead that runs from the steering servo to the receiver was far too long, so I coiled the excess length and bound it with two tie wraps.)



On an off-road car, such as the one shown here, it's often necessary to run the ESC lead under the battery pack. You *can* route the lead over the pack, but you may accidentally rip it out of the receiver during a rushed battery-pack change. To protect the lead, cut a small piece of double-sided tape, and place it over the part of the ESC lead that's directly under the pack (3). Remove the protective paper from the tape, and rub the adhesive off with your finger.

If you've followed each step in this series of articles, then your finished product should be functional and attractive. Remember, every detail is important when you assemble an R/C car—from building the chassis to painting and mounting the body. The more effort you put into the hobby, the more enjoyment you'll get out of it.

PUTTING IT TO WORK

Using the right capacitor is only part of the solution. How—and where—you solder them to your motor is just as important. Remember three things: keep all wires short, keep the capacitors close to the motor and make sure that the solder joint is secure.

With an ESC, never put the capacitors on a connector that's an inch or more from the motor can. The RF radiation from the motor won't hurt anything if it stays inside the can, but any wire attached to the motor, e.g., the speed controller leads, the capacitor leads, etc., will act as an antenna. I can't stress how important it is to keep all wires as short as possible, including the capacitor leads.

It's a little more work, but you should solder the two capacitors to the lug at the end of each power lead. Solder the other side of the capacitor to the motor can as close to the lug as possible. Solder the third capacitor between the two lugs where the power leads are connected. You can solder either lead of a ceramic capacitor to a positive or negative lead; aluminum and tantalum capacitors, on the other hand, are polarized, meaning they have positive and negative leads. Always connect positive to positive and negative to negative, or you'll damage the capacitor. (The liquid electrolyte in aluminum capacitors will sometimes cause them to explode—with a mild pop and a lot of fizz—when they've been hooked up backwards.) If you plan

(Continued on page 90)

PCHobbies

KING INTERNATIONAL SUPER SPEEDWAY

TRC LYNX II ELITE	\$154.95	TRC FOAM TIRES - BLUE & GREEN COMPOUNDS	
TRC LYNX SS NARROW	197.50	1/10th SCALE FRONTS	10.95 pair
TRC PYTHON GAS	249.98	1/10th SCALE REARS	12.95 pair
HYPERDRIVE H10RS. NARROW	197.50	PROTOFORM BODYS - YOUR CHOICE	
HYPERDRIVE H10RS CHASSIS CONVERSION	76.49	OF T-BIRD, LUMINA OR PONTIAC	
LYNX SS GROUND EFFECTS NARROW GRAPHITE		BODY WITH SPOILER	14.50
CHASSIS	55.95	BAD DOG POWER BRUSH CUTTER	22.95
LYNX II SUPER SPEEDWAY CONVERSION KIT WITH		NEW TRC T-BIRD BODY	14.00
GROUND EFFECTS CHASSIS	119.95	PCH MOTOR HOOD ALIGNMENT TOOL	19.95
LYNX GRAPHITE BUMPER	15.95		
TRC 1/10th T/M PRO RADIALS - FRONTS	12.25 ea		
TRC 1/10th T/M PRO RADIALS - REARS	13.60 ea		
ANDY'S BODY'S T-BIRD, LUMINA, PONTIAC	13.50 ea		

PCHobbies, 143 Industrial Drive,
King, N.C. 27021 Phone # 919 - 983 - 2514

THE FIRST COMPLETE BRUSH TUNING KIT!

Get the hot tips on brush tuning in the complete, detailed instructions included inside SAIKO's Pro Brush Cutting Kit. Made of hard-anodized aluminum, this rugged and precise jig comes with a high-quality cutting file and storage case complete with multiple brush compartments and space for two race-day motors.

P.O. Box 1515 • Tustin, CA • 92681



SAIKO
RACING PRODUCTS

Get **MAXIMUM**
performance
from your
motors!

TEMP GUN

(Continued from page 23)

temperature to determine which capped-tire compound to use. My favorite use is to determine my pain threshold for hot pizza! I'm sure that the more you play with it, the more uses you'll find.

Is it worth it to spend three bills on a thermometer for an engine of equal or lesser value? If you run for fun in your backyard, the answer is no; but, if you want to compete against other hot-dogs, it might be a good investment. If you belong to a club or a team, consider splitting the cost. Knowing the temperature of your engine helps you get the most from it without blowing it up!

*Here's the address of the company featured in this article:
Racer's Choice, 6N258 Acacia Ln., Medinah, IL 60157.

RAIDER PRO

(Continued from page 32)

tage. With a retail price of only \$109.99, it won't drain your wallet. (I've seen it offered for as low as \$69.99 through mail-

(Continued on page 90)

TEAM A&L
Quality • Reliability • Durability

▼ Steering Kits

▼ S10 Truck Body

▼ Wings & Gear Cover

▼ Lazer Body (Tub Optional)

▼ Bearings & Shims

▼ 1/2 Ton Chevy Body

▼ Chassis Stiffener/Batt. Hold-Down

▼ Power Clutch (4 Models Avail.)

▼ Lethal Weapon II

▼ Aluminum Lazer Parts

▼ Shock Towers & Limiters

▼ RC-10 Intruder Body

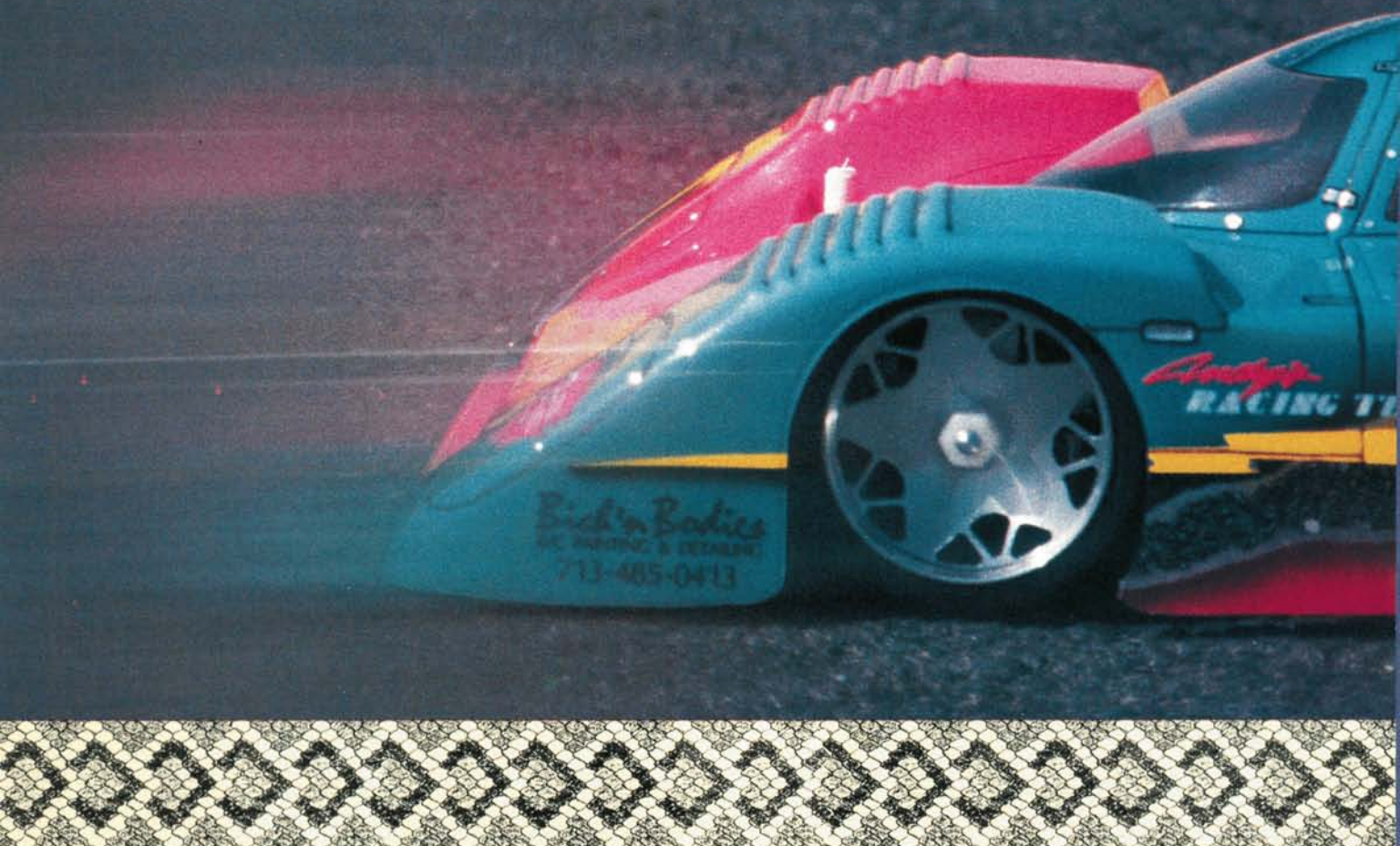
▼ Monster Truck Accessories

Also Available with Power Clutch

For Technical Information Call:
(714) 735-5249
8:00 am to 3:00 pm (Pacific Time)

For Catalog send \$2.00, Canada - \$2.50 in U.S. Funds, Overseas - \$3.50 in U.S. Funds. Sticker Sheets are available in fluorescent pink, yellow or blue - \$1.25 ea. T-Shirts are available in two colorful styles in S, M, L, XL, & XXL. A&L Rear End - \$10.65 ea., Power Clutch/Lethal Weapon - \$11.95 ea. Please add shipping of \$3.50 for 1-3 shirts. CA residents add 7.75% sales tax. Mail to A&L Manufacturing, P.O. Box 2115, Corona, CA 91718

TRACK REPORT



by JEFF BRONSTEIN

THIS YEAR, ALMOST every major R/C manufacturer produced some type of gas-powered vehicle. Nitro burners are the fresh craze for an eager, spirited racing breed, and if you haven't taken the plunge, TRC/Composite Craft's* Python may be just the enticement that you've been waiting for.

This new racer is a hybrid $1/10$ -scale pan car with a potent Fox .15 2-stroke engine that pumps out loads of power. Its simple layout resembles that of an ordinary, on-road chassis, but gas power adds a dimension of fun and realism. Even if you don't get a firm grip on the Python at first, it will get a grip on you!

One of the oldest misconceptions about gas cars is that they're difficult to build and

maintain. Well, that's true—*not!* As in any sport, it's difficult to master the fine points initially. Two-stroke engines are as easy to use and as reliable as electric motors. (How many times do I have to tell you guys this?) The Python is as uncomplicated as you can get, yet it has all the power and reliability of a $1/10$ -scale electric-powered pan chassis. In addition, this snake won't take a huge bite out of your wallet. Its wholesale price

is less than \$300, which also includes the engine, wheels and tires.

The Python was designed to attract $1/10$ -scale electric drivers to the exciting world of gas racing, and it eliminates the potential frustrations of full-suspension tuning and adjustment. Most of its parts originate from conventional $1/10$ -scale electric technology, most notably, the magnesium front cross-bar and aluminum turnbuckles (from the

TRC/COMPOSITE CRAFT

PYTHON

Snake in the Grass

Lynx II) and the rear-end drive, which consists of a steel diff axle, universal wheel hubs and green-dot tires on white nylon wheels. It's easy to keep this car on the track.

As in most TRC kits, the Python's components come in separate, numbered bags for easy assembly. Helpful photos of each procedure enhance the instruction manual, but don't just look at the pictures; read the instructions, too! If you have any 1/10-scale building experience, assembling this car should be a cinch.

Unlike the flex-plate pods used on electric on-road cars, the Python's aluminum rear pod is attached securely to its flat

graphite pan chassis and its radio tray. Although the radio tray has a single damping disk between its front mount and the chassis, the damping is noticeable only on the largest bumps. Rear suspension relies on the flex of the hourglass-shaped chassis to absorb most of the shocks.

The only real rear-end modification is a disk brake that's incorporated in a slightly modified 1/10-scale Trinity "Magic" spur gear. The pinion/clutch bell housing and flywheel

are mounted directly on the engine crankshaft to facilitate easy gear changes and proper gear mesh by way of the engine mounts.

Before shipping, Fox protects the internal parts of its engines with a thin, waxy film, which you must remove completely before you use them. The instruction man-



FOR

Manufacturer	TRC/Composite Craft
Type	Gas-powered on-road
Scale	1/10
Price	\$439.95

Overall length	14.75 inches
Width	9.75 inches
Wheelbase	12.15 inches
Front track	8.75 inches
Rear track	9.25 inches

Gross 2 pounds, 7 ounces

Type Not included

Type Pan
Material Graphite/aluminum

Engine	Fox .15
Battery	Radio receiver pack (not included)
Primary	Pinion/spur
Transmission	Direct drive
Differential(s)	Ball
Bearings/bushings	Bearings

Front: Type	Floating kingpin
Damping	Coil spring
Rear: Type	Flex chassis
Damping	Friction damper

Front: Type TRC lightweight nylon
Dimensions (DxW) 1.95x1.125 inches

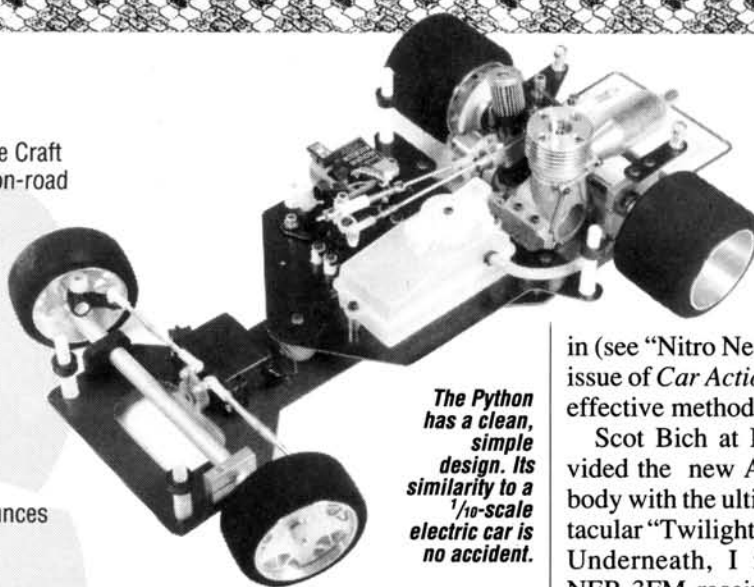
Rear: Type TRC lightweight nylon
Dimensions (DxW) 1.95x2.0 inches

Front/rear TRC green-dot foam

Novak NER-3FM micro receiver; JPS Custom Wheels; HPI pre-trued, green-dot tires; Magic Motorsports* Pro Pinion Gear, Pro Spur Gear and Best Balls; Andy's Nissan NTP-90 GTP body; Bich'n Bodies painting and detailing.



The Python is an affordable, gas-powered alternative to electric cars. The package works well despite the fairly unsophisticated rear suspension. Its handling is very similar to that of most 1/10-scale electric pan cars. After it has been broken-in, the Fox .15 engine provides good acceleration with blistering top-end speed.



**The Python
has a clean,
simple
design. Its
similarity to a
1/10-scale
electric car is
no accident.**

ual suggests that you remove the back plate and submerge the entire .15 engine in gasoline or some other solvent to soak off the substance. If you're an experienced (or adventurous) builder, I recommend that you disassemble the entire engine, clean it thoroughly and reassemble it with adequate lubrication. You can't be too clean or too careful with a new, high-performance engine! After you've prepped the engine, install the tuned pipe before you mount the engine on the chassis.

The throttle/brake servo requires very little movement or torque, and any microservo will fit nicely in the radio tray cutout. The small slide carb moves roughly 1/2 inch from fully closed to fully open, and the radio end-point adjustment should be set carefully to limit the servo travel. If the adjustment is set incorrectly, it may put stress on the carb and the servo. Also, be sure that the throttle-override spring disengages the brake properly when the carb begins to open.

The instruction manual thoroughly describes how to adjust the car and engine for the best performance, but I don't recommend that you use the break-in procedure that it outlines, i.e., run-in the engine under "no-load" conditions with the wheels off the ground. Although this is a viable method, the engine could overheat and be damaged irreparably. A slightly rich track break-

in (see "Nitro News" in the March '92 issue of *Car Action*) is the safest, most effective method.

Scot Bich at Bich'n Bodies* provided the new Andy's* Nissan GTP body with the ultimate finish—a spectacular “Twilight Zone” paint scheme. Underneath, I installed Novak's* NER-3FM receiver, a JR* servo for throttle and an Airtronics* servo for steering. For the ultimate touch, I use a wicked set of JPS* custom wheels to give this unit *Car Action* style.

On test day, a curious group of electric-car drivers gathered as I prepared the car for its first laps. I was ready to burn up the track—no need to peak those pesky cells! Unlike some other 1/10-scale gas cars, the Python doesn't have a built-in pull-starter. As

far as I'm concerned, that's fine—one less thing to break. Any good hand-held or bench starter will work. I filled the small fuel tank and hit the flywheel twice with the starter before the Fox .15 came to life. The carburetor was still set from the break-in process, so I had to

make a few minor needle adjustments to bring the power band "on line."

I expected the car's solid rear end to be very choppy and loose, much like early 1/8-scale flat pan cars, but I was pleasantly surprised. With my steady finger on the throttle, the car was stable and solid in the corners. If you have an exponential function on your transmitter, I recommend that you desensitize the low-end throttle input. With an additional rear wing and slightly softer rear tires, I'm sure that the Python would handle similarly to any 1/10-scale electric car. Still, the solid rear-end pod could be improved to enhance the car's performance.

With a displacement of 2.5cc, the

The Python is as uncomplicated as you can get, yet it has all the power and reliability of a 1/10-scale electric-powered pan chassis.

A SPECIAL MESSAGE TO RETAILERS

IMAGINE the benefits of drawing many more regular customers into your store every month. Imagine adding a popular, **profitable**—and returnable—hobby product to your store. By stocking **Model Airplane News**, **Radio Control Car Action**, the **Radio Control Action Series** and **Radio Control Boat Modeler**, you'll accomplish both! These are the most informative and entertaining modeling magazines available to the R/C consumer—and they're in tremendous demand. These magazines will actually stimulate more sales of R/C airplanes, cars, boats and accessories for you.

If you aren't already stocking Air Age magazines, please call us toll-free, and we'll let you know how they can make money for you.



Call Sally or Janet Toll-Free at
1-800-243-6685

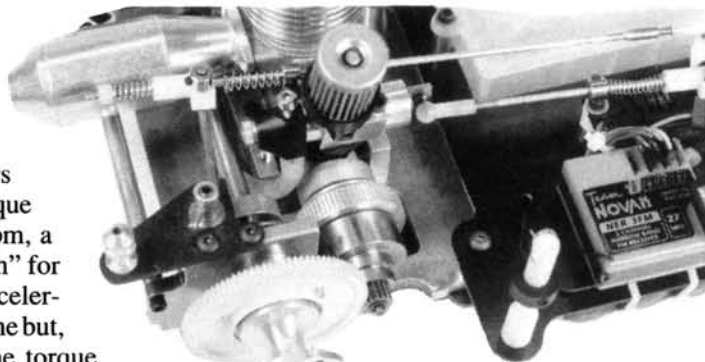
(in CT, 203-834-2900)
(dealer inquiries only)

Air Age Publishing
251 Danbury Rd., Wilton, CT 06897

PYTHON

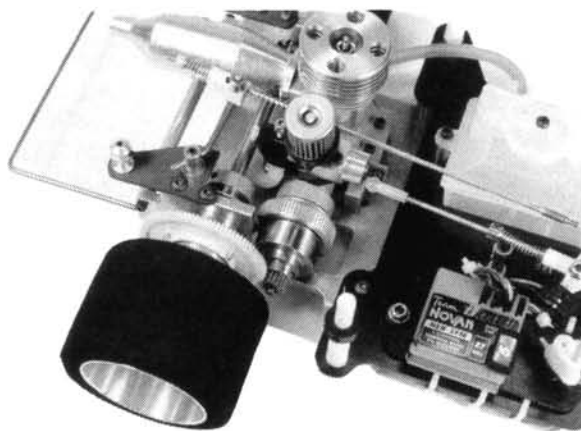
Fox .15 is just 1cc shy of the power generated by 1/8-scale car engines. Unlike electric motors which make the most torque when they're at zero rpm, a gas engine has to "reach" for torque. The car may accelerate moderately off the line but, as the rpm increase, the torque really kicks in. The clutch uses three arc-shaped centripetal clutch shoes (which I lightened for better response), much like an ESC torque limiter does.

Off the line, the clutch engaged late, but this was useful on the tight test track. The Python really showed its power through the sweeper and down the back straight. Elec-



The Python's primary drive train is essentially the same as those used on 1/10-scale electric cars. To accommodate the disk-brake assembly, the Trinity "Magic" spur gear has been slightly modified.

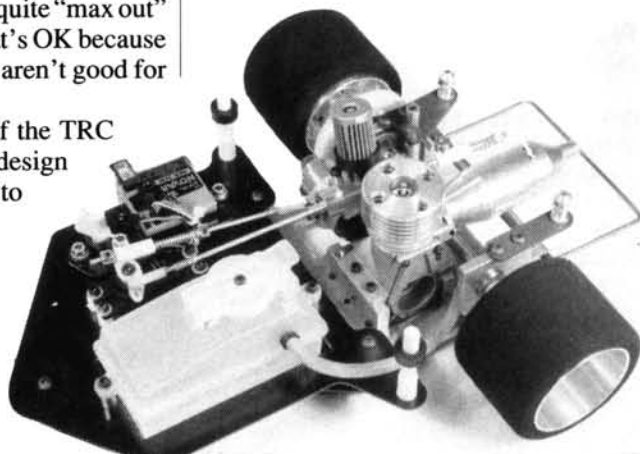
ing has the potential to be very successful in the U.S. We have the 1/10-scale tracks, and there are plenty of racers looking for new challenges. It's certain that, like the Python, if gas racing gets a grip on you, it won't ever let go!



The radio receiver is mounted on a small fiberglass plate, which is attached to the chassis with rubber grommets. This isolates the receiver from vibration.

tric cars can't touch the Python once it gets going. The engine couldn't quite "max out" on the short straight, but that's OK because long periods of full throttle aren't good for small engines.

My overall perception of the TRC Python is mixed. Its simple design enables novice gas racers to get into nitro action easily, but it lacks a certain ingenuity. The car should be popular with electric racers, who can use most of their current equipment to run it, but TRC shouldn't have been constrained by 1/10-scale electric design. Gas-powered 1/10-scale rac-



The potent Fox .15 can be temperamental, but it has all the power and speed you could possibly want.

**Here are the addresses of the companies mentioned in this article:*

TRC, P.O. Box 1058, Albemarle, NC 28001.

Bich 'N Bodies, 4903 Cloverfield Rd., Pearland, TX 77581.

Andy's R/C Products, 1710 Grevelia Ct., Ontario, CA 91761.

Novak Electronics Inc., 128-C E. Dyer Rd., Santa Ana, CA 92707.

JR; distributed by Hobby Dynamics Distributors, P.O. Box 3726, Champaign, IL 61826.

Airtronics Inc., 11 Autry, Irvine, CA 92718.

JPS Custom Wheels, P.O. Box 3014, Fullerton, CA 92631.

Magic Motorsports, a subsidiary of Trinity Products, 1901 E. Linden Ave. #8, Linden, NJ 07036.

PART I

Training wheels not required



LET'S ESTABLISH the fact that I'm a beginner right off the bat. Although I've constructed and flown R/C airplanes, I've never built or driven an R/C car. Heck, I've never even held a wheel-type radio in my hands!

If you're a beginner, too, then you might enjoy this two-part article. Together, we'll soon be up to speed!

TRUCK TALK

The Tamiya* Nissan King Cab is a truck so, to enable it to overcome large obstacles, its wheels and tires are big, and its ground clearance is high. Some trucks were designed as cars and later modified to look like trucks. Tamiya, however, designed

beginner's

KING CAB

by BOB CARPENTER

the King Cab as a truck from the start, so it's tough enough to take its fair share of abuse!

To protect the internal equipment, its chassis sides are tall; you can see

them even when the body is on. In addition to this unique feature, the King Cab was the first Tamiya vehicle to have a ball diff. There's no mistaking *this* truck for a converted car!

LEARNING TO CRAWL

When the kit arrived, I tore into it right away. I read the instructions and, minutes later, was deep in the first stages of assembly. The first step—attaching the

steering plate and front stabilizer bar to the chassis—involved more than 25 small parts, which I had to find either in one of eight bags or on plastic trees. At first, I was overwhelmed, but then I developed a strategy. I found the parts necessary for each step and put them in plastic baggies, which I marked to correspond with steps in the instructions. Most of the parts are shown in full-size drawings in the instruction manual, so it's easy to find the correct nuts, screws, ball nuts, etc., for the job. This saved me a lot of time.

My overall progress was slow. I spent an hour mounting the front suspension's lower A-arm assembly on the chassis. Although experienced builders would probably have been more than halfway through the entire process by this time, I had to be methodical. The speed of my progress gradually improved and, thanks to the well-written manual, I never felt lost or confused.

I enjoyed assembling the truck. Building R/C airplanes frustrates me because you have to be a craftsman; nuts and bolts, however, I like. Each step takes you through a logical progression, so I never found myself scratching my head for long.

BEGINNING BODY WORK

For me, painting the body was the trickiest procedure. (The hardest part was masking the tonneau cover for a coat of black paint.) I learned one very important thing: for a neat, good-looking paint job, the edges of the masking tape must be completely burnished to the inside of the body. I didn't do this, and the result was a less-than-sharp line between the colors. After a few post-paint-

job touch-ups, however, I managed to make the car's appearance acceptable, although I'll probably never enter it in a concours event. I finished it off by painting details on the headlights, taillights and side markers.

After driving the truck for a couple of months, I had to replace the body. Luckily, my local hobby shop had one, although I was surprised at its price—about \$36. Unless my driving improves, this hobby could prove expensive!

TRAINING TO TROUBLESHOOT

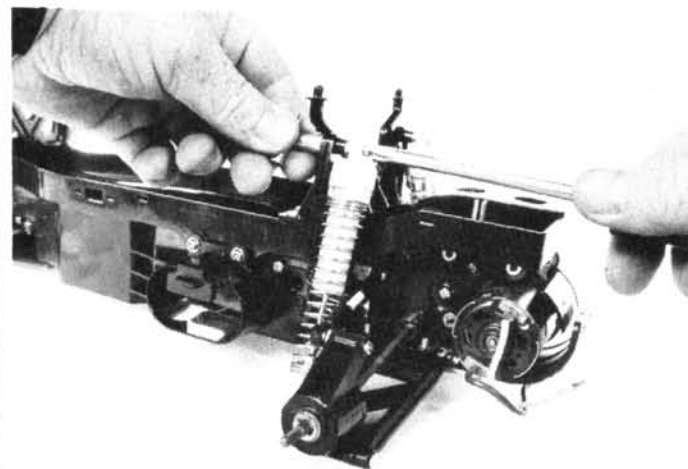
I learned a lot during my first driving sessions and, perhaps, my "learn-as-you-go" experiences will help you to troubleshoot any problems that you encounter.

● **Steering.** After a few runs with curbs and some end-over-end tumbles, the truck's steering failed. (Actually, I could turn it slightly in either direction, but the steering was

"twitchy.") Although I inspected the truck thoroughly, I couldn't find anything wrong with it. I thought that there might be a problem with my Technisport* radio, so I called

".. There's no mistaking *this* truck for a converted car!"

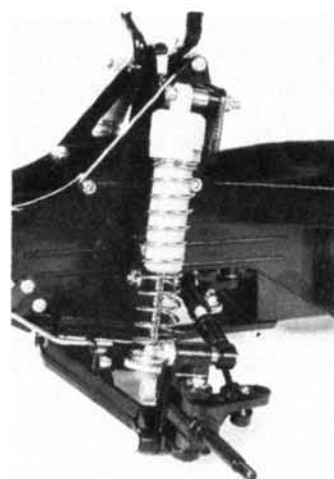
the manufacturer. The solution was simple. When I operate the radio, I rest my thumb next to the dial that's used to adjust the dual rate, i.e., the amount of steering-servo



The included four-sided wrench is especially useful when you want to attach or remove the wheels. Power is transferred from the efficient tranny to the rear wheels through drive shafts that are held in place by O-rings.



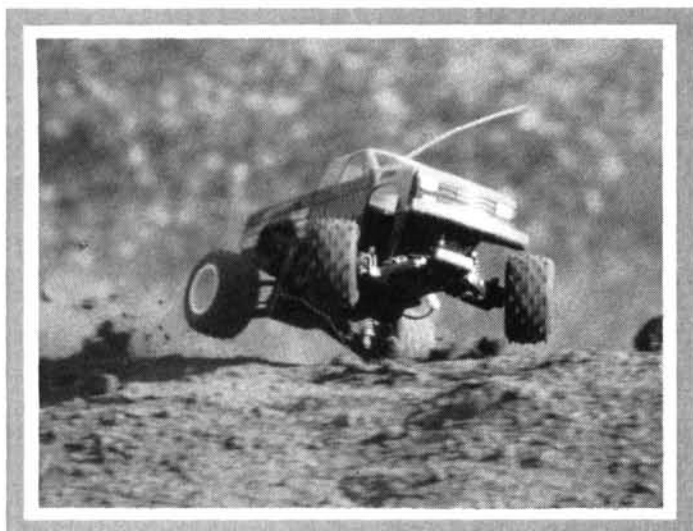
These boxes and a battery were all that stood between me and the sport of driving R/C cars. Eight hours after this photo was taken, I had the Tamiya Nissan King Cab screaming around my backyard!



The bottoms of the front shocks pivot on ball joints, and the tops are offset with bushings. If this were a full-size race truck, I'd worry about flex in the upper mounting area, but in a 1/10-scale racer, such flex isn't a problem.

throw. It's very easy to move that dial inadvertently—possibly to a point where the steering capabilities are lost. After I learned this, I checked the dial regularly to be sure that the dual rate was adjusted properly.

The next steering problem I encountered wasn't as easy to solve. After tagging a concrete wall for the 12th time, I noticed that truck's front wheels were pointing new and interesting



directions. Earlier driving errors had caused the steering tie rod to pop off the ball nut, but this was more serious. The steering arm, which is part of the spindle assembly, had snapped off. I tried to glue it in place with CA, and I added some extra bracing. The arm, however, is subjected to too much torture during hard hits for such a setup to be effective, so I had to replace it. The part

wasn't very expensive, so I also bought a plastic body-mounting tab to replace one that had snapped off when I accidentally drove the truck under a full-size car.

● **The differential.** I had installed the proper number of Belleville washers (as spacers) in the diff but, during "standing-start" accelerations, the diff slipped for the first 10 to 15 feet. (It's only supposed to slip for 3 feet.) After a while, it slipped so much that the truck would barely move. I disassembled the diff and inspected all its parts, but everything seemed to have been assembled properly, and there weren't any signs of wear. The Belleville washers, however, weren't applying enough pressure to the diff balls, so I installed extra washers. Now, each side of the diff has two washers that push against each other, and this has greatly improved the truck's acceleration capabilities and increased its top-end speed.

So, here's a tip: to adjust the amount of slippage in the King Cab diff, simply increase or decrease the number of washers. Although Executive Editor Frank Masi tells me that this is common knowledge among "veteran" racers, I think

"I learned a lot during my first driving sessions and, perhaps, my "learn-as-you-go" experiences will help you to troubleshoot any problems that you encounter."

that a hard-earned lesson is a well-learned one. Experience really is the best teacher.

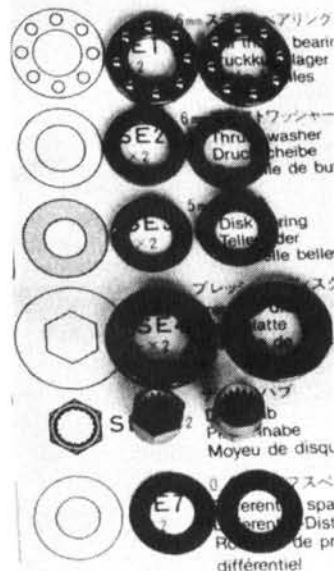
● **Maintenance.** I've learned that you can't drive an R/C car and then just toss it in the garage until the next outing. Proper maintenance is extremely important.

Check that all the nuts and bolts are secure after each session, or you'll spend a lot of time (and money) replacing

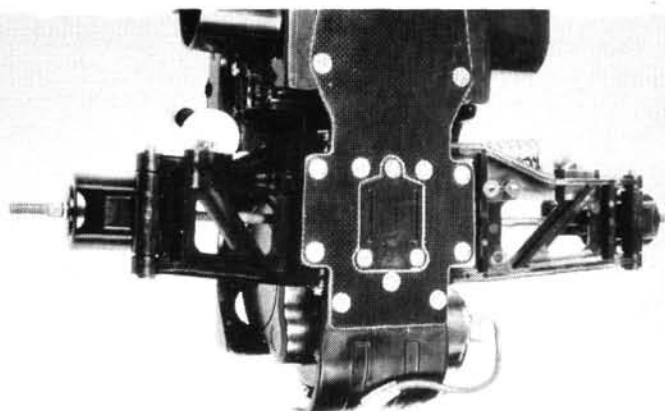
able at hobby shops). Oh, and be sure to re-oil its bushings!

● **Tire selection.** I drove my Nissan King Cab so much that I wore out the first set of tires in three days! (I spent far too much time driving on concrete and asphalt.) It cost \$15 to replace them, so I decided to run on dirt for the rest of the tests. I still wore out the tires after just five or six full days of driving. Although 2.2-inch-diameter

Ball thrust bearing (ball)
(Druckkugellager-Beutel)
(Sachet de butées à billes)



The instruction manual guides you through assembly with extremely helpful exploded-view drawings and full-size plan views.



A composite plate stiffens the chassis, and a removable hatch provides easy access to the diff gear and balls.

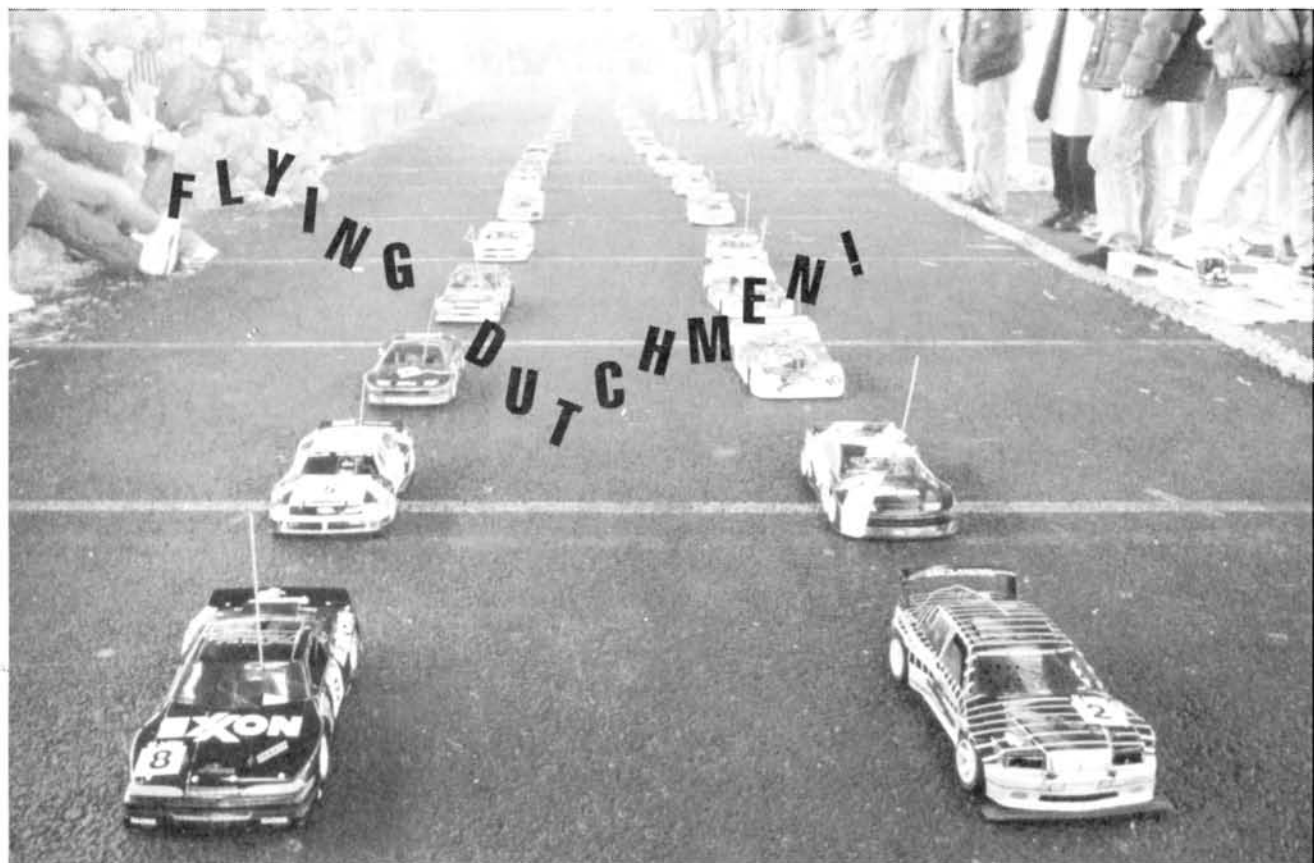
lost parts. (I know, because I did it.) The suspension parts and the screws underneath the chassis often loosen. (I would have used Loctite* thread-locking compound, but the type I had requires heat to remove screws that have been treated with it. The truck has so many plastic parts that I couldn't even consider using it.)

Always keep your car or truck clean. Use an old paintbrush to dust it off after each run. Also, you should periodically clean your motor with a blast of motor spray (avail-

dirt-track-style tires are hard to find, I plan to use them for everyday driving where maximum acceleration isn't critical. I'll save the pin-style tires for serious dirt slinging!

Next month, I'll detail some of my King Cab driving experiences—both on and off the track!

**Here are the addresses of the companies mentioned in this article:*
MRC/Tamiya, 200 Carter Dr., Edison, NJ 08817.
Technisport, distributed by MRC.
Loctite Corp., 4450 Cranwood Ct., Cleveland, OH 44128. ■



SERPENT'S INTERNATIONAL 1/10-Scale Gas Race

INTERNATIONAL 1/10-scale gas racing is on the move! MACH (Model Auto Club Heemstede), hosts of the '89 IFMAR 1/8-Scale World Championships, had the honor of being the first club to organize an international 1/10-scale gas race. Serpent, eager to introduce its Impact cars to racers, sponsored this highly enjoyable event, and race director Sander de Graaf and his staff did an excellent job setting it up. It was held on January 25 and 26, 1992, at an indoor racing facility in Lisse, Holland, and it attracted 56 drivers.

The facility was equipped with an AMB lap-counting system,

which worked wonderfully; a large, electronic scoreboard did the rest. What a help to an organizer! Every big event should have a large scoreboard because it makes the racing so much more exciting for the spectators.

SPECIAL RACING FORMAT

To attract drivers with a variety of skills, MACH wisely decided to make three classes—more or less according to the European Federation of Racing Automobiles (EFRA) plans. The Group 10 Class was for novice drivers who ran standard .10 (1.7cc) Magnum and O.S. engines and sedan-type bodies. To simplify things, they

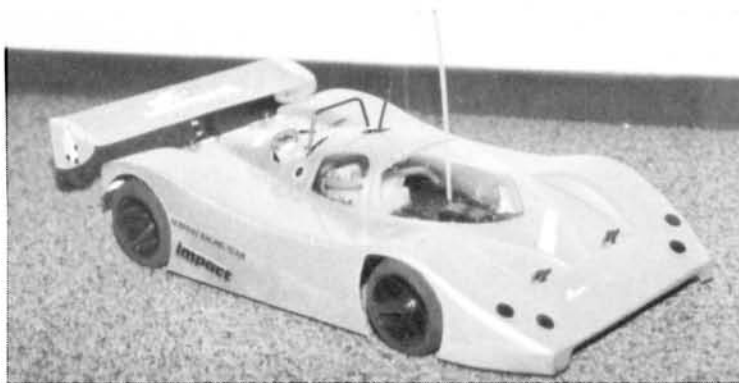
only had to run on the 300-foot oval course.

The middle class, Group 12, ran .12-size engines (mainly O.S. CZ-Rs and Enya 11s) and also used sedan bodies. Originally, this class was to compete only on the roadcourse, but many of the drivers had never run on an oval course before, and they enjoyed it so much that de Graaf changed the format to let them race there as well.

In the Group 15 Class, the drivers used .15 (2.5cc) engines and Group C/IMSA bodies, and they ran on both the oval and the roadcourse.

The event used an innovative

B Y R O N A L D B A A R



Stefan Koenders'
winning car had a
Parma Sauber-
Mercedes body.

qualifying format. Instead of the usual 5-minute heats, there were two timed practice sessions. The transponder recorded all the lap times, and after two 15-minute sessions, the three best consecutive lap

The right people were on the starting grid.

RACING

The Group 10 qualifying showed that the youngsters had still a lot to learn, but

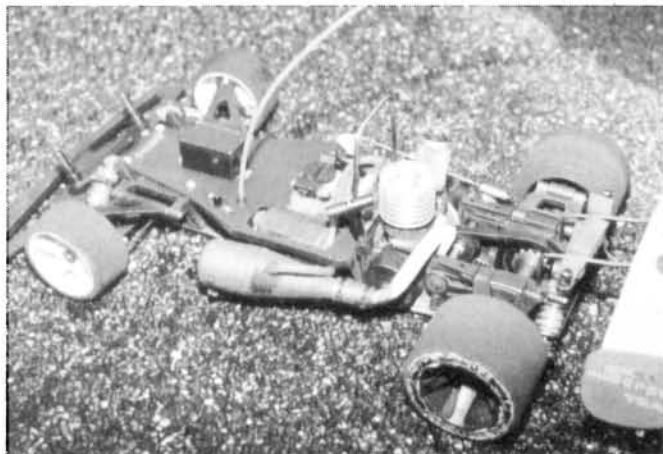
is the son of Pieter Bervoets, the CEO/GM of Berton Holland, which makes Serpent cars.) In the middle of the race, Ron had a one-lap lead over Tim, but his engine flamed out. He restarted, but he finished one lap behind Tim. Tim's twin brother Jan-Pieter was a close 3rd. A new generation of racers approaches!

In Group 12, there was fierce competition between

18-year-old Joost Koenders, 13-year-old Pim Janmaat and Belgian Lode Haling. Joost won both races, beating Pim by only two seconds on both the oval and the roadcourse. What a class!

The two Group 15 finals were big spectacles. The cars in this class set a good pace in the qualifying rounds, but surprisingly, when we compared the times, the smaller .12 CZ-R engines out-qualified the larger .15 engines. This was owing to the size of the track and the slippery conditions—made worse by some drivers' use of tire compounds, which were forbidden by the organizers! It was very difficult to get power to the track.

The oval final was exciting—close racing and spectacular maneuvers. Most of the race belonged to Stefan Koenders, Michael Salven, Milko Tenthof and Rob Kuijper, but the last two dropped back when their engines flamed out. The pace was very fast: winner Koenders averaged 6.9 seconds per lap on the oval.

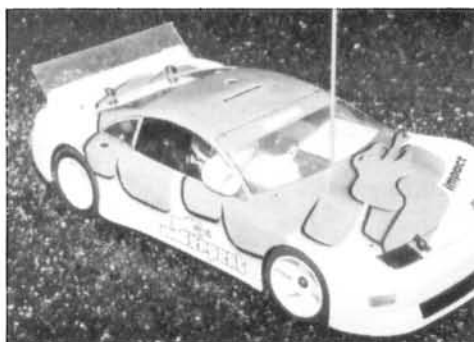


Above: Nine-year-old Tim Bervoets' almost-standard Impact 10 has a Magnum GP-10 engine and an effective, super-silent sidepipe. Tim won the Group 10 Class.



Michael Salven with his O.S. CZ-H 2.5cc-powered Serpent Impact. That paint job won the Concours.

This neat-looking Nissan 300-GTO had a special side-cooling vent, but cooling wasn't a problem at this race. The temperature was only about 41 degrees Fahrenheit.



times were computed. This established the qualifying order and determined who would participate in the final. This successful system eliminated the stress of running the heats, gave the drivers plenty of time on the track and ensured that the finals were fair.

that's what this class is for! There was very little difference in qualifying times among the first five finishers, but they were considerably slower than the other classes. The final was a race between nine-year-old Tim Bervoets and Ron Elbersen. (Yes, Tim

INTERNATIONAL 1/10-SCALE

GROUP 10 FIN.

	Name	Country	OVAL Laps/Time
1	Tim Bervoets	Netherlands	27/5.10.2
2	Ron Elbersen	Netherlands	26/5.11.3
3	J.P. Bervoets	Netherlands	24/5.10.7

GROUP 12 FIN.

	Name	Country	OVAL Laps/Time
1	Joost Koenders	Netherlands	30/5.06.2
2	Pim Janmaat	Netherlands	29/5.00.0
3	Lode Haling	Belgium	29/5.01.2

GROUP 15 FIN.

	Name	Country	OVAL Laps/Time
1	Stefan Koenders	Netherlands	87/10.00.7
2	Michael Salven	Germany	84/10.03.6
3	Milko Tenthof	Netherlands	67/10.04.8

Experienced 1/8-scale drivers took the honors in the Group 15 main event (from left to right): Michael Salven, Stefan Koenders and Milko Tenthof.



Belgian Eric Vandereydt won on the roadcourse, but his time wasn't good enough to place him in the top three. Koenders was the deserving winner, followed by Salven of Germany and Tenthof. All three are top 1/8-scale drivers. Experience shows, doesn't it?

The Concours lineup was impressive, and the judges selected the three best paint jobs. Salven's Group C paint job, which is very similar to the that on his 1/8-scale car, was the winner.

THE CARS

Most of the drivers used Serpent Impact chassis. Some Kyoshos and Schumacher Nitro 10s showed up, but they were no match for Serpent's thoroughbred racing chassis. It isn't a fair comparison either...it's like comparing a Formula 1 or Indy car against a rally car at Indianapolis.

Some of the Group 10 cars had solid rear axles, so the drivers had difficulties keeping their cars on a tight racing line. Ball diffs seem to be necessary for this type of racing.

Tire wear was minimal;

several racers even told me they had no wear at all. Only Tenthof used a 2-speed transmission, and it wasn't really an advantage on such a small track—it would have been on a larger, outdoor, 1/8-scale track, though!

ENGINES

The .10 Magnum GP-10 engine was the most popular engine in the Group 10 Class. It seems to be very reliable as long as it isn't run too lean. (The carburetor setting is critical. Racers tend to adjust it on the lean side for good throttle response, but this will make the engine overheat.) The old-style pull-starter also caused some problems, but the bolt-on type that's now supplied with the Magnum GP-10 engines is much more rigid and reliable.

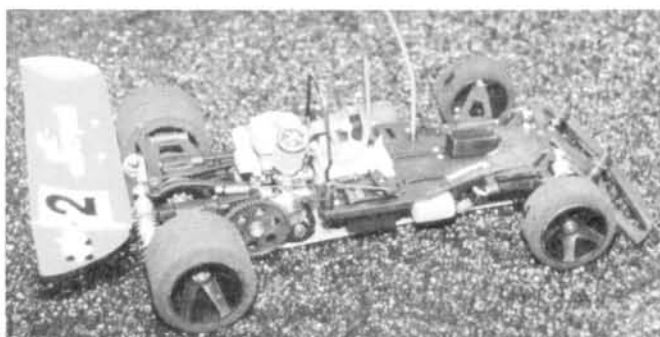
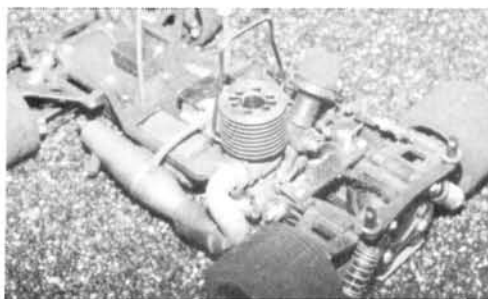
Group 12 was dominated by the O.S. Max CZ-R. It runs reliably and is very responsive—probably the best engine for this race. Quite remarkably, the CZ-R ran longer on a 60cc fuel tank than the GP-10 engine—10 minutes to seven. (This must

be attributed to the carburetor setting that's necessary to run the GP-10.) In the Group 15 Class, two drivers used Irvine 15s, one an O.S. Max CZ-H and one a prototype Serpent Mega-RS15.

selves, and isn't that what R/C racing is all about?

More national and international racing is planned, including a championship series in England, Belgium, Holland and other European

Milko Tenthof's Impact, with its 2-speed transmission, was probably the fastest of the pack, but it couldn't get all the power to the slippery track.



Stefan Koender's Serpent Impact was too fast when equipped with a .15 engine, so he powered it with an O.S. CZ-R .12 to race in the .15 class!

GAS RACE RESULTS

Car	Engine
Impact	Magnum GP-10
Impact	Magnum GP-10
Impact	O.S. FP-10

ROADCOURSE

Laps/Time	Car	Engine
29/5.00.0	Impact	Magnum GP-10
29/5.02.9	Impact	Magnum GP-10
28/5.03.5	Impact	O.S. CZ-R 12

ROADCOURSE

Laps/Time	Car	Engine
64/10.06.7	Impact	O.S. CZ-R 12
44/10.01.7	Impact	O.S. CZ-H 15
57/10.05.3	Impact	Mega RS15

All the .15 engines were very fast, but they were smooth because their port timing is limited by the EFRA specs. They all used small 5mm outlet pipes.

The first international 1/10-scale gas race was clearly a success. The racing format and the class divisions were well-thought-out, and the racers appreciated it. Everyone seemed to enjoy them-

countries, and the first U.S. 1/10-scale gas nationals. Perhaps the time is right for this new, exciting (and affordable) class to grow. (Let's hope that racers adhere to the EFRA rules that limit engine development; that's what keeps this class from becoming a money game.) Maybe 1/10-scale gas will be the racing class of the future!

How To BUILD A TIRE-TRUING MACHINE

by RUSS TOY

SIZE 'EM UP!

WHEN I switched from off-road racing to on-road racing, I soon noticed that foam tires wear down quickly. Off-road tires can last for two or three races, but on-road tires must be re-trued after every meet, and your car's tires don't wear at the same rate. That's why I decided I needed a tire truer.

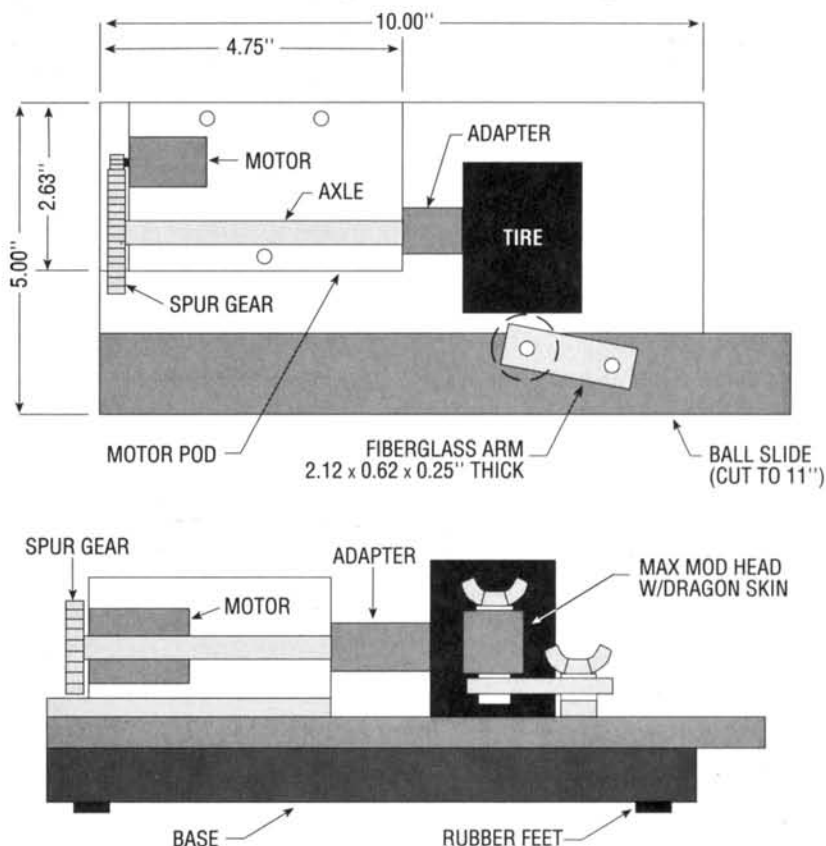
You can true your tires with a drill press and a sanding block, but this is inaccurate and doesn't give predictable results. You can spend \$250 on an expensive machine, but few of us can afford that. You could try one of those trackside grinders, but they don't do a very good job. I have a solution. With an old motor pod, a couple of used stock motors, some wood and a little brainstorming, I came up with my own machine.

LET'S GET STARTED!

My starting point was a motor pod from a Hot Trick on-road kit, although any motor pod should work. You want the tire to spin counterclockwise, so use a left-hand drive pod, or just hook up the motor backwards. Cut the axle flush with the hub, drill and tap for a 54-tooth spur gear and install the gear with 4-40 socket-head screws. Slide the axle into the pod, and tighten down the spacer hub until there's only a little play. Install a stock motor with a 13-tooth pinion, and adjust the gear mesh. I use 32-pitch gears from my parts bin, but the truer would run more quietly with 48-pitch gears.

Mount a single-pole, single-throw switch (available at Radio Shack) in a convenient place on the pod. You might have to drill an extra hole. (Be sure that the switch will clear the drive train when you wire the motor.) You'll need 3 or 4 feet of 16-gauge lamp wire from any hardware store. Solder the wire from the motor to the switch, leaving two leads to be connected to your pack. I use Associated* connectors on the end of the cord, but you can use alligator clips or any type of connector.

(Continued on page 88)



• PARTS LIST •

Motor pod with drive train
10x5x0.63-inch base
4.75x2.63x0.63-inch pedestal
16-inch-long cabinet ball slide
Fiberglass arm
Max Mod cutting head
Dragon Skin sandpaper
4 stick-on rubber feet
1 pair AJ RC10 BBS adapters
2—RC10 axle roll pins
9/32-inch brass tube
5/16-inch brass tube
1 pack of no. 8 nylon wing nuts

1/4-20 wing nut
10-24 wing nut
1/4-20 2-inch-long screw
10-24 1-inch-long screw
3—no. 1/4 washers
3—no. 10 washers
no. 1/4 locking washers
2—no. 10 locking washers
10-24 hex nut
1/4-20 hex nut
3/4-inch-long wood screws
SPST switch
3 to 4 feet, 16-gauge lamp cord
Pair of alligator clips

BUILD A TIRE-TRUING MACHINE

Next, cut a $2\frac{5}{8} \times 4\frac{3}{4}$ -inch pedestal and 5×10 -inch base out of a $\frac{5}{8}$ -inch-thick board. You can use pine or fir, but mahogany works better. Use white glue to attach the pedestal to the base in the upper left corner. Clamp them together, or weight the entire thing down, and let it sit overnight.

The next day, position the right edge of the pod over the right edge of the pedestal, and mark where the screw holes will be drilled. Use at least three wood screws. Mount the motor pod on the pedestal, making sure that the spur gear just clears the bottom. The axle should be $1\frac{5}{8}$ inches away from the base.

For wheel adapters, I chose AJ's* BBS RC10 adapters. Mount them temporarily on wheels, and enlarge the axle hole with a $\frac{1}{4}$ -inch drill bit. To ensure a perfectly centered hole, you should use a drill press for this operation. Enlarge the other adapter with a $\frac{5}{16}$ -inch drill bit. The adapter with the $\frac{1}{4}$ -inch hole should fit the axle snugly. This will be the rear tire adapter. Insert two RC10 roll pins into the hub and 180 degrees apart.

The front adapter must have a brass fitting pressed into it. The fitting is made out of two pieces of tube that have been soldered together. Cut a slot about $\frac{1}{4}$ inch away from the end of the $\frac{5}{16}$ -inch-diameter brass tube. Slide the tube over the $\frac{9}{32}$ -inch-diameter tube, and solder over the slot. File off the excess solder. Cut the tube down to a length of 0.450 inch, and file the sharp edges. Use a vise to press the fitting into the adapter until it's almost flush with the rear of the hub. A shoulder should protrude 0.050 inch from the face of the adapter. It will engage the front wheel hub.

When using the adapters, the threaded part of the axle should protrude past the wheel spokes. The length of threaded axle that protrudes varies according to the front and rear adapters and types of rims used. I put a spacer between the two

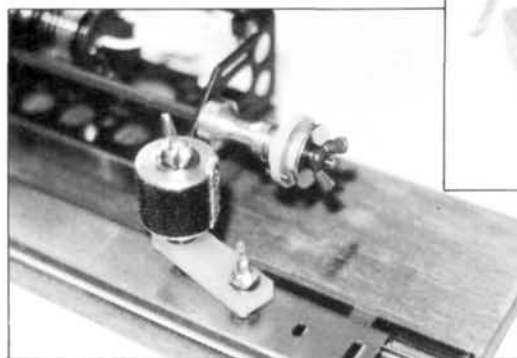
adapters. You can probably find a $\frac{1}{4}$ -inch spacer at any electronic surplus store.

Mount the wheels on the adapter with fender washers and nylon wing nuts, which are easy to replace when they're stripped (and you won't have to replace the axle). For the HPI* rear wheels, use regular $\frac{1}{4}$ -inch washers and Associated aluminum body-mount washers. Because of their deep-dish shape, you have to wedge the wheels between the adapter and the washers. Install a $\frac{1}{4}$ -inch washer and then an aluminum washer, and lock the two down. Turn on the pod for a moment to see whether the wheel spins true. If it doesn't,

loosen the wheel and try again.

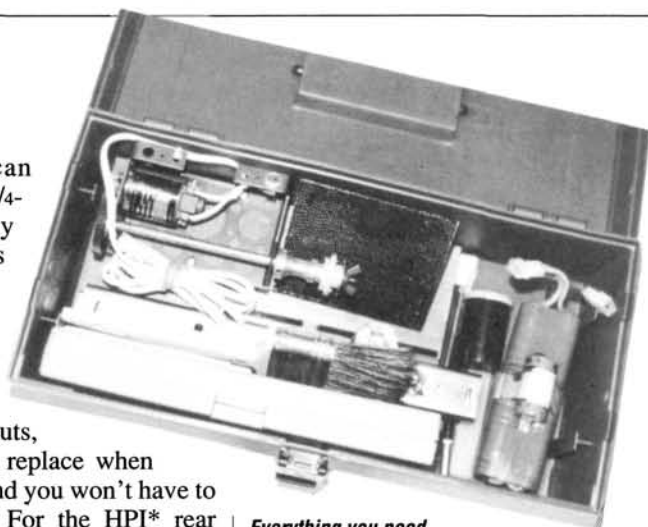
I used a hardware-store cabinet ball slide for a carriage. I looked for a 10-inch solid-bearing slide, but I had

"My tire truer isn't a super-high-tech machine, but it's the next best thing for those of us who are on a budget."



Here's a close-up of the cutting-head/swing-arm assembly. Loosen the wing nut to move the swing arm and adjust the depth of cut.

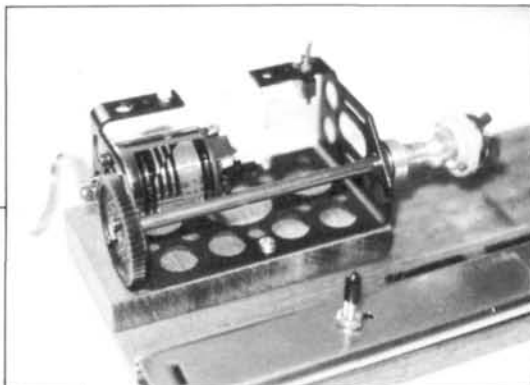
no luck. The shortest ball slide I could find was 16 inches long, so I shortened it to 11 inches, so it would be $\frac{1}{2}$ inch away from the built-in stops. Follow the instructions on how to disassemble the slide. If you don't have access to a bandsaw and a disk sander,



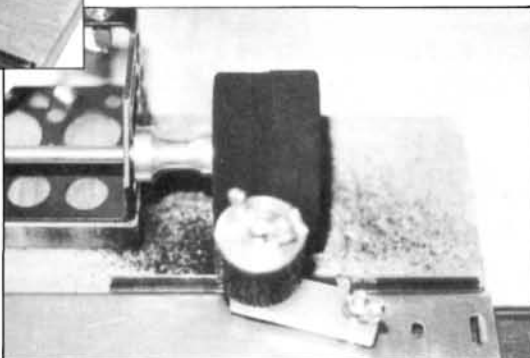
Everything you need is in the box: truer, dial calipers, a paintbrush, battery packs, extra Dragon Skin and wing nuts.

you can cut it with a hacksaw and a file.

Run a piece of 2-inch masking tape along the top of the base and underneath the axle. Attach a 2-inch rear wheel (without rubber) to the axle with the adapters you made. Turn on the pod for a minute to check that the wheel runs true. Lay a triangle 90 degrees against ends of the wheel and mark these points on the tape. Draw a line between the two



The pod is from an old Hot Trick on-road kit. Note that the spur gear just clears the pedestal.



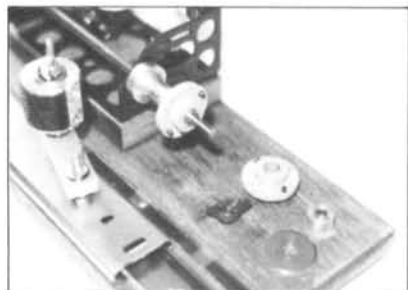
The front adapter is shown on the axle with the rear adapter and spacer on the base. Note the Lexan shield in front of the slide; it prevents the slide from becoming clogged.

PHOTOS BY RUSS TOY

points and two lines perpendicular to the wheel, on opposite ends of the base. Measure $1\frac{1}{8}$ inches from the wheel, and draw a line between the two points. This is the center line of the slide. Place the slide over the center line with the left end flush with the edge. Mark and drill the holes for the wood screws. Install the bottom slide on the base, but don't tighten it yet.

You could use a sanding drum, but for heavy-duty cutting, I recommend the Max Mod cutting head with Dragon Skin—a thin metal-oxide sandpaper that makes cutting tires a lot easier. The cutting head must be sleeved to fit over a $\frac{1}{4}$ -inch bolt, so you'll have to make another fitting out of brass tube. Slot and solder as before, and cut the tube to a length of about $\frac{7}{8}$ inch. Using a vise, press the sleeve flush into the head.

The amount you shave off the tire is controlled by a fiberglass arm that's locked in with a wing nut. Loosen the nut, and you'll be able to adjust the depth of the cut. You'll need a $2\frac{1}{8} \times \frac{5}{8}$ -inch strip of $\frac{1}{4}$ -inch-thick fiberglass. Drill a $\frac{1}{4}$ -inch hole, $\frac{1}{4}$ inch from the edge, in its center. Using a no. 11 bit, drill a 0.191-inch hole $\frac{1}{4}$ inch



Here we are cutting away. Note that the dust is collecting on the base and not going into our faces. Nevertheless, always wear goggles when truing tires.

away from the other end. Put a $\frac{1}{4}$ -20x2-inch screw through the arm, and install a $\frac{1}{4}$ -inch washer, a locking washer and a hex nut. Drop a flat washer over the screw, then the head, another washer and a $\frac{1}{4}$ -inch wing nut.

Insert a 1-inch, 10-24 or 10-32 screw through one of the top slide's pre-punched holes, and lock it with a no. 10 washer, a locking washer and a hex

(Continued on page 118)

STAGE III

"THE ULTIMATE CELL TEST"

Introducing Stage III Platinum Racing Cells and Assembled SpeedPaks

SuperSpeed & SuperSpeed Pro Series for On-Road Racing!
Stadium Raider & Stadium Raider Pro Series for Off-Road Racing!
HydroSpeed & HydroSpeed Pro for Electric Boating!

All Stage III Platinum Racing Cells and SpeedPaks are conditioned and matched with our proprietary cycling system. Join the winners who have already discovered Stage III.

Get the Pure Power Value of Stage III Sanyo & Panasonic SCR's Available Nationally—Dealer Inquiries Welcome

SUPER 13

ULTRA BRAID

GEMINI BRUSHES

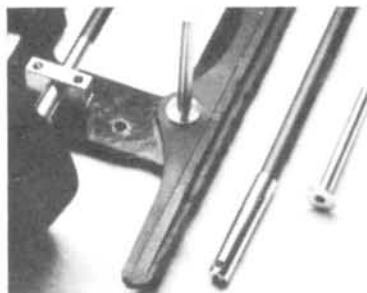
DRAGON WIRE

CELL SHRINK

STAGE III "The Ultimate Cell Test"

1189 Chicago Road • Troy, MI 48063-4239 • (313) 585-1150 • (313) 978-9085 FAX

ABSOLUTELY THE LIGHTEST FRONT AXLE AVAILABLE: ONLY ~10 GRAMS!



privately made in USA

THE FINEST AXLE FOR WORLD CLASS RACING IS FINALLY HERE!

UNIQUE FEATURES:

- *Ultra light aluminum tipped graphite design
- *1/3 the weight of standard axles—10 GRAMS
- *Independent caster setting using only one cinch block
- *Adjustable width (full width or SS in one)
- *Beautifully polished CNC machined components
- *Available to fit Lynx Elite/SS/Hyper 10SE/SC/SS and other straight front axle cars (specify dia.)
- \$24.95 —Please specify car or dia. of axle required—
- Also available: CNC machined aluminum body posts
- \$5.50 /pair —Please specify length—

Add \$2.00 S&H

Send check or money order payable to:
(checks allow 15 days to clear)

Hammad Ghuman
6 Tower Heights, Albany NY 12211
(518) 458-8441

(DEALER INQUIRIES INVITED)

For ALL Your RC Needs...

- RC Cars, Parts & Accessories
- Two Indoor Tracks (clay & carpet)
- One Outdoor Track • Pulling Pit
- Computerized Scoring • Competitive Racing
- Friendly, Expert Service
- UPS Service • Discount Prices • Major Credit Cards



WALT'S
HOBBY

(315) 453-2291

2 Dwight Park Drive, Syracuse, NY 13209

GLD **1/4 Scale & Gas Car Specialists**
RACECARS INC.
"Home of the \$795
1/4-Scale Grand National Car."

Call for information or visit us.

World's 1st speed shop for R/C cars. We're racers—talk with us.

Visa/MasterCard

For retail or mail order information, please call: (516) 243-4152.

• **GLD Racecars, Inc.**
370-B Commack Rd.
Deer Park, NY 11729



Ace Hardware Hobbies



1/8 Scale Gas

Gas Cars

On-Road

Serpent (6020)	\$509.99
Bmt 891	\$525.99
Bmt 893	\$595.99
Pico Genesis/motor	\$809.99
RC500 (2wd)	\$260.99

Off-Road

Burns Dx	\$249.99
Turbo Burns	\$419.99
Inferno	\$449.99
Bmt 911	\$489.99
Pirate	\$339.99
Mugen S.S.	\$399.99
Nitro Crusher	\$349.99

1/10TH GAS

Impact 10 Std.	\$285.00
Impact 10 Comp.	\$285.00
Outlaw Rampage	\$259.99
Pirate 1/10 4wd	\$175.99
O.S. CZR	\$79.99
Tuned Pipe & Man.	\$55.99
O.S. Slide Carb	\$39.99

Engines

Stock

Novarossi 5-Port	\$149.99
Novarossi 7-Port	\$169.99
Pico 5-Port	\$209.99
OS Rxb/Rxr	\$225.99
Rex 3-Port Buggy	\$189.99
Rex 6-Port	\$265.99
Rex 7-Port	\$269.99

Modified

Pico 5-Port	\$269.99
Rex 3-Port Buggy	\$239.99
Rex 6-Port	\$299.99
Rex 7-Port	\$345.99

Accessories

Rex Pipe Al650	\$35.99
Ops Filter/Boot	\$8.00
On-Road Bodies	\$17.00
Temp Gun	\$299.99
Futaba 9301	\$49.99
Futaba 9302	\$69.99
Much More!!!	

Custom Parts

On-Road

Bmt Universals	\$45.99pr.
Serpent Universals	\$45.99pr.
Alloy Wheels	\$89.99(4)
Bmt 3-Speed	\$175.99
Mounted Fr. Wheels	\$15.25pr.
Mounted Re. Wheels	\$15.99pr.
Many Alloy Parts!!!	

Off-Road

Burns Fr. Brake	\$24.99
Burns Alloy Arms	\$49.99pr.
Burns Fiber Brake	\$14.99
Many Other Parts	

Information

ACE HARDWARE HOBBIES
1863 EL CAMINO REAL
BURLINGAME, CA 94010
415-697-6099
FAX 415-697-6801

Handling \$5.00, COD Chrg. \$3.75
 Send \$4.00 for Extensive Catalog
 Ask for JR when ordering
 Prices Subject to Change w/o Notice

Send \$5.00 for complete & extensive parts catalog.

RAIDER PRO

(Continued from page 66)

order houses.) Overall, the Raider Pro is the perfect kit for the beginning R/Cer who's looking for a bargain price—without limits on fun!

*Here are the addresses of the companies mentioned in this article:

Kyosho/Great Planes Model Distributors, P.O. Box 9021, Champaign, IL 61826.

KO Propo; distributed by Global Hobby Distributors, 10725 Ellis Ave., Fountain Valley, CA 92728.

Pactra Inc., 620 Buckbee St., Rockford, IL 61104.

Tower Hobbies, P.O. Box 9078, Champaign, IL 61826.

NIGHTSTALKER

(Continued from page 63)

stalled a Futaba* MC112B and wired the battery packs in parallel. The truck is a little slower now, but it has about a 20-minute run time, and I haven't rolled it over again. The lights are powered by two AA batteries. They run down quickly, but I didn't have room for more batteries.

I installed the controller, the receiver and the AA batteries under the driver's cockpit. I operate the truck with a Futaba Magnum Sport radio.

When I had finished, I had just what I wanted—something truly different. I sure proved my friends wrong: you *can* chop a Lexan body! The twin Parma Hemi engines really add to the Nightstalker's realism, and when I run the truck at night, the lighting system helps me to see where it's going. Remember, there's no law that states that all R/C cars and trucks must remain in stock form, so go crazy!

*Here are the addresses of the companies mentioned in this article:

MRC/Tamiya, 200 Carter Dr., Edison, NJ 08817.

Trinity Products Inc., 1901 E. Linden Ave. #8, Linden, NJ 07036.

Parma International Inc., 13927 Progress Pkwy., North Royalton, OH 44133.

Pro-Line USA, P.O. Box 456, Beaumont, CA 92223.

DuraTrax; distributed by Great Planes Model Distributors, P.O. Box 9021, Champaign, IL 61826.

Pactra Inc., 620 Buckbee St., Rockford, IL 61104.

Testor Corp., 620 Buckbee St., Rockford, IL 61104.

Custom Chrome Parts Mfg., 34518 Warren Rd., Ste. 273, Westland, MI 48185.

Tecnacraft, 1335B Dayton St., Salinas, CA 93901.

Tekin Electronics, 970 Calle Negocio, San Clemente, CA 92672.

Futaba Corp. of America, 4 Studebaker, Irvine, CA 92718.

RADIO GEAR

(Continued from page 65)

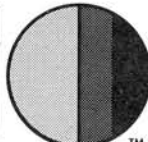
to use an ESC with reverse, use 2.0 microfarad ceramic capacitors instead of polarized capacitors.

(Continued on page 118)



PRO

DYNO



10, 15, 20, 25, 30 amp loads controlled by LAVco constant current circuitry. Voltage regulation prevents the power supply from influencing the results. Pack voltage simulation for 4, 6 and 7 cells at each load...15 settings!! LCD displays for POWER (efficiency) and optical sensed digital RPM. Custom flex-coupling prevents misalignment drag from influencing the test. The **Pro DYNO** is now available at a retail price of \$600.

For stock and mild modified motors, LAVco's **Sport DYNO** retails for \$350.

MADE IN AMERICA

LAVco USA 3150-B E. La Palma, Anaheim, CA 92806 • (714) 632-7262 • FAX (714) 632-8705

It's Absolutely TRUE!

TRUE TURN ultra-precise hubs and axles give you the smoothest and truest running diff assembly ever made!

Titanium Axle Features:

Precision grind • Diff face turned after assembly • Cross-drilled and pinned for notched diff rings

To fit: • 10-L • 10-LSS • 12-L • Bolink • Delta • C/C • TRC • C&M ...and most others!

Hub Features:

CNC Machined 7075-T6 aircraft aluminum • Hard Anodizing • Cross drilled and pinned for notched diff rings • Precision bearing fits • Clamp style left hubs • Also available in Delrin!



TRUE TURN
 RACING PRODUCTS
 by Stevens & Son

(714) 352-3002 3333 Harrison Ave., #5, Riverside, CA 92503
 Dealer and distributor inquiries only: (800) 622-2846

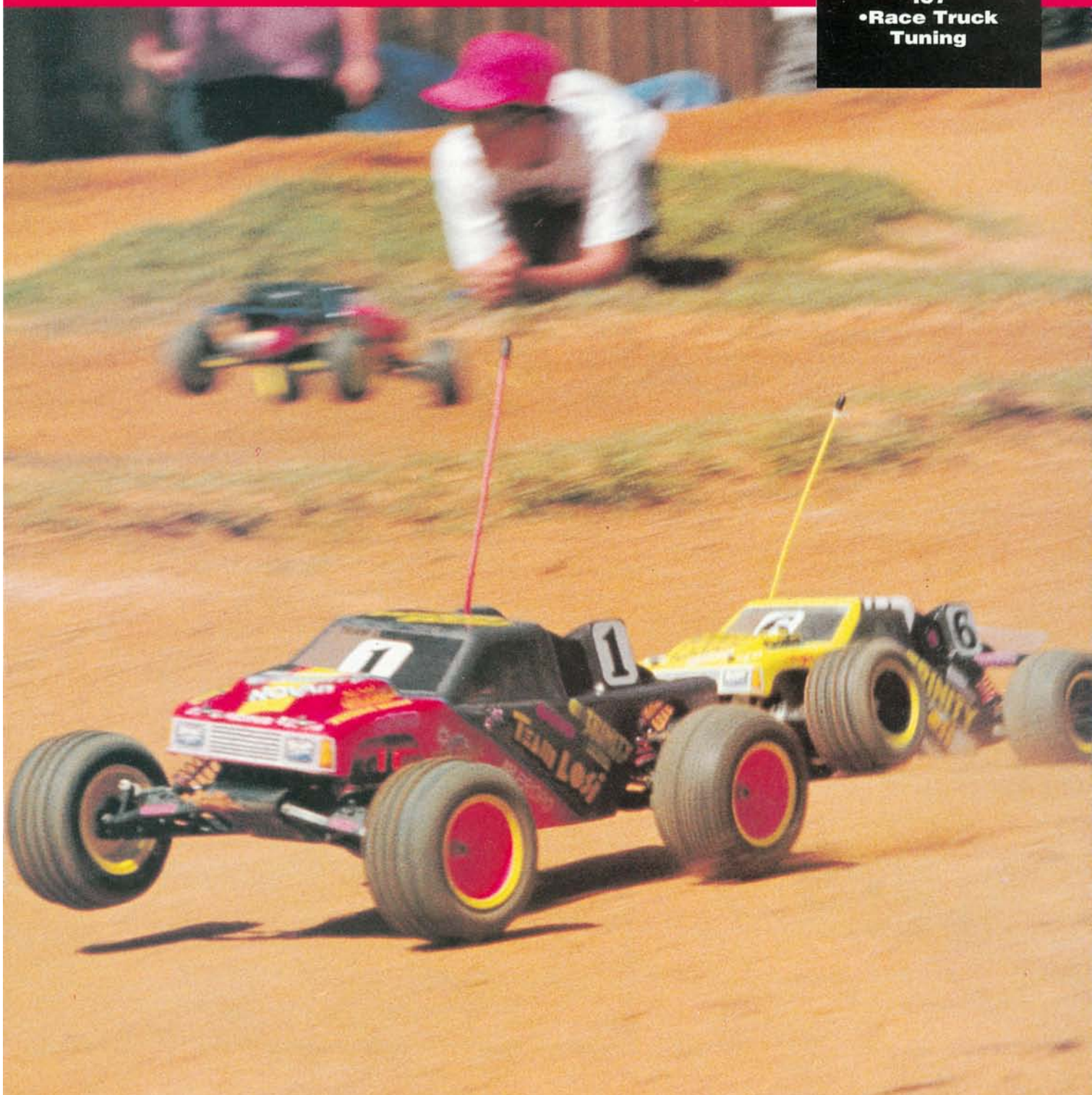
Radio Control **Racer**

94
•Team Losi
Florida
Winter
Champs

104
•Speed Shop

106
•Hot Tracks

107
•Race Truck
Tuning



FLORI



For 12 years, Florida's has hosted the Florida race has become the unofficial features all the big names names you might not know. This year, the event took place on March 1, at Lake Park.

DA WINTER

ARTICLE AND PHOTOS BY JOHN HUBER



PIONSHIPS

t Coast Radio Control Club
inter Championships. This
start of the racing year; it
all the big teams and a few
t.
ce on February 27, 28 and
mpa. The '92 race was

sponsored by Team Losi, who pulled out all the stops. Also
present were teams from Associated, Traxxas and
Schumacher.

The West Coast R/C facility is one of the best I've ever
seen! It's in a beautiful county park that also has a BMX
track, open fields and picnic areas. I suspect that there
was even a stable nearby, as we saw people riding horses.





THE TRACK

This premium off-road track is a challenge, even for world-class drivers. The surface is a mixture of red clay and sand that provides good, consistent traction. (The track crew was largely responsible for the high quality of the track throughout the weekend.)

Here's the setup: a long straightaway leads drivers into a sweeping right turn, where they must brake hard to enter a very sharp right turn that's followed by an equally sharp left turn; the cars then head off a double "staircase" jump (which most of them

clear), followed by a sharp left turn and a short section of moguls. After the moguls, there's a tight 180-degree turn, a

This scratch-built car (known as the Homey 10.5) featured narrow rear and front ends with extra-long suspension arms.



The Concours winners pose with their loot. First-place went to Danny Maio (left).

short straight and a 90-degree right turn that sets the cars up for another left. Then, there's another short straight with a double jump, followed by a 180-degree left turn and another sharp right turn that leads into a right sweeper turn. Cars enter the turn uphill and drop off as they come out of it. Finally, they navigate a short area of scattered moguls that sends them back down the front straightaway.

The huge drivers' stand towers over the front straightaway.

Although its sides are open, it has a small roof to protect drivers from the pounding sun. Under the stand are the tech officials, the announcer and the computer lap-counting system. The transmitter impound was a separate, mobile building. Race organizer Tim O'Daffer and his crew kept everything running smoothly. Of special note is that the club hired turn marshals; this made it much easier for racers to concentrate on racing.



FLA CHAMPS

using the "IFMAR start" for qualifying. Instead of all 10 cars blasting for the first turn at once, they're allowed to start at 1-second intervals. This eliminates those all-too-common first-turn pileups that can ruin a race for even the best drivers. It also eliminates the advantages of being on the front line and the disadvantages of being in the rear. In this situation, drivers don't have to be concerned with their field positions; each car races against a clock that starts as the car crosses the transponder loop.

As is often the case, the first day of qualifying didn't necessarily set the stage for the Mains. Although the track crew did a tremendous job maintaining the surface, the results on Saturday were different from those on Friday. We knew that the racing would be hot and close!

In the Modified Truck Class, the Trinity/Losi team was the force to be reckoned with this year. After Associated's victory in 1991 with its then-new RC10T, Losi got busy with their truck.

Losi came back to stake a claim with its new LX-T version of its truck, and by placing seven LX-Ts in the A-Main, that's exactly what they did. NORRCA Truck National Champion Jack Johnson was in the front row, followed by his teammates Jon Anderson, Kyle Reed

and Jay Halsey.

In the 2WD Modified Class, Losi only managed to secure two positions in the "A." Fortunately, one was TQ Anderson; behind him were Traxxas's new recruit Rick Vehlow and Associated's Frosty St. Clair.

Team Losi dominated again in 2WD Stock—six cars in the A-Main. Losi driver Scott Hughes led Associated's Greg Hodapp and Losi's

Mike Marshall.

Kyosho/Associated driver Matt Ledger led the 4WD Modified Class, followed closely by Kyosho/Twister driver Kris Moore and 1992 Reedy Race winner Rick Hohwart.

THE MAINS

All the modified classes ran IFMAR-style A-Main events, in which drivers accumulated points in three races—one point for 1st, 10 for 10th (simple!). The drivers could throw away their worst-race points; when the remaining points were tallied, the driver with the least

Eustace Moore of MIP hams it up for the camera. His newest version of the 4WD Legend is very impressive.



points won. The 2WD Stock Class ran only one A-Main.

TRUCK MODIFIED

One of the best sets of races that weekend had to be the Truck A-Main. The racing was fast and rough between equally talented drivers. At the start of the first round, a crash put Halsey in the lead. He was closely pursued by teammate Ron Rossetti and Traxxas's John Walters. At 1:40, Johnson moved past Walters and into 3rd, but at the 3:00 mark, Johnson moved into 2nd and Anderson moved into 3rd, and that's the order in which they finished.

The winner of the previous round started the next round in the front row, so Halsey had a good position. He blasted into the lead again, followed by Walters, Gil Losi and Rossetti. They traded positions for the duration of the race, and Halsey led Walters and Losi across the finish line.

Halsey started the third round on the front line, but he didn't dominate this time. Instead, Mike Dunn took the lead, followed by Rossetti and Johnson. With 55 seconds left on the clock, John-



QUALIFYING

The qualifying was held on Friday and Saturday, and it was different from the system that has been used at most races until now. There seems to be a trend toward



Jim Watt was on hand to show off the new JR radio. It can count laps and store settings for up to six cars.



Losi's new LX-T dominated the Truck Class. This new truck and a conversion for the JR-XT are available now.

son passed Rossetti; the three battled for the rest of the race, but the field remained the same. After the scores had been tallied, Halsey took top honors with two points, followed by Johnson (four points) and Dunn (five points).

2WD MODIFIED

The first round was a race between Anderson, Cliff Lett and Vehlow. Johnson climbed into the 3rd spot at the 3-minute mark, but he lost it again, and it was Anderson, Lett and Vehlow at the finish.

In round two, Anderson and Lett shot for the lead, but Lett was in front after one lap, followed by Anderson and Johnson. Asso-



Jammin' Jay gets his 2WD car ready to race. His truck was tough to beat that weekend.

ciated's Brian Kinwald crept into the 3rd position, then into the 2nd. Lett finished 1st, trailed by Kinwald and Anderson.

In the 3rd round, Carlos Gonzales of Peak Performance got a break and stole into the spot

behind the leader, Anderson. Lett was close behind. With 1:45 to go, Gonzales moved ahead of Anderson and Lett, but Kinwald was on his way up and he and Cliff managed to pass Anderson. In the end, it was Gonzales, Lett and Kinwald. Lett won

(three points), followed by Anderson (four points), and Gonzales took 3rd (five points).

2WD STOCK

Unfortunately, there isn't as much to say for the Stock Class. TQ

Hughes blasted into the lead, followed by local driver J.R. Mitch and Losi's Marshall. These three duked it out for the race, but no one budged. At the 1:40 mark, Marshall's car flipped, but he maintained his position. Hughes drove flawlessly and held on for the win, followed by Mitch and Marshall. I think that next year, all the A-Mains should be run IFMAR-style—even the Stock Class.

4WD MODIFIED

It was disappointing to see so few drivers entered in the 4WD Class—fewer than 50 racers. Despite the numbers, the racing was fast and furious! The pre-

TRUCK MODIFIED

Fin	Qual	Name	Chassis	Motor	ESC	Radio	Batteries
1	4	Jay Halsey	Team Losi LX-T	Trinity	Novak	Airtronics	Trinity pushed
2	1	Jack Johnson	Team Losi LX-T	Trinity Kevin-Kevin	Novak M5	JR	Trinity pushed
3	7	Mike Dunn	Team Losi LX-T	Race Prep 16T	Novak MXc	KO Propo	Mower Power
4	8	John Walters	Traxxas Blue Eagle	East Coast Mods	Tekin	Futaba	PTI
5	5	Gil Losi	Team Losi LX-T	Trinity	Novak M1c	Futaba PCM	Trinity pushed
6	6	Ron Rossetti	Team Losi LX-T	Trinity	Novak MXc	Futaba PCM	Trinity pushed
7	10	Mark Pavidis	Associated RC10T	Reedy Mr. A	Novak 410	Airtronics	Reedy
8	2	Jon Anderson	Team Losi LX-T	Trinity	Novak M5	Airtronics	Trinity pushed
9	9	Cliff Lett	Associated RC10T	Reedy Mr. A 14T	Novak M5	Airtronics	Sanyo SCR
10	3	Kyle Reed	Team Losi LX-T	Trinity Helter Skelter	Novak M5	KO Propo	Trinity pushed

2WD MODIFIED

Fin	Qual	Name	Chassis	Motor	ESC	Radio	Batteries
1	8	Cliff Lett	Associated Team Car	Reedy 10T	Novak M5	Airtronics	Sanyo SCR
2	1	Jon Anderson	Team Losi Pro SE	Trinity	Novak M5	Airtronics	Trinity pushed
3	10	Carlos Gonzales	Associated Team Car	Peak Performance 15Q	Novak M5	Airtronics	Team Orion
4	4	Brian Kinwald	Associated Team Car	Reedy	Novak	Airtronics	Reedy
5	2	Rick Vehlow	Traxxas TRX-1	Peak Performance	Novak	Airtronics	Team Orion
6	5	Mark Pavidis	Associated Team Car	Reedy Mr. O	Novak	Airtronics	Reedy
7	6	Jack Johnson	Team Losi Pro SE	Trinity Kevin-Kevin	Novak M5	JR	Trinity pushed
8	7	Kris Moore	Kyosho Triumph	Twister 11T	Novak	Kraft	Max-Cell SCR
9	9	Bret Reelfs	Associated Team Car	Reedy Mr. A	Novak M1c	Airtronics	Reedy SCR
10	3	Frosty St. Clair	Associated Team Car	Reedy Mr. H	Novak	KO Propo	Reedy

2WD STOCK

Fin	Qual	Name	Chassis	Motor	ESC	Radio	Batteries
1	1	Scott Hughes	Team Losi Pro SE		Novak M1c	Futaba	Team Smooth
2	5	J.R. Mitch	Team Losi Pro SE	H	Tekin 411P	Airtronics	ERP
3	3	Mike Marshall	Team Losi Pro SE	A	Tekin	Futaba	Power Push
4	2	Greg Hodapp	Associated Team Car	N	Tekin 411G	Airtronics	Reedy
5	8	Jim Brown	Team Losi Pro SE	D	Novak M1c	Airtronics	ERP
6	4	Todd Lewis	Team Losi Pro SE	O	Tekin 411G	Airtronics	Max-Cell
7	9	Wade Whitaker	Associated Team Car	U	Novak MXc	KO Propo	HRS
8	7	Chris Dorn	Associated Team Car	T	Novak M5	KO Propo	Turbo Schacht
9	6	John Diener	Team Losi Pro SE		Tekin 411P	Airtronics	Hurricane
10	10	James Galleto	Traxxas TRX-1		Novak M1c	Airtronics	New Wave

4WD MODIFIED

Fin	Qual	Name	Chassis	Motor	ESC	Radio	Batteries
1	4	Carlos Gonzales	Kyosho Lazer ZX-R	Peak Performance 12T	Novak MXc	Airtronics	Team Orion
2	3	Rick Hohwart	Kyosho Lazer ZX-R	Peak Performance 12D	Novak MXc	Futaba	Team Orion
3	2	Kris Moore	Kyosho Lazer ZX-R	Twister 11T	Novak MXc	Kraft	Max-Cell
4	5	Bret Reelfs	Kyosho Lazer ZX-R	Reedy Mr. O	Novak MXc	Airtronics	Turbo Cells
5	6	Jürgen Lautenbach	Schumacher Boss Cat	LRP Blue SE	LRP LE	KO Propo	LRP
6	1	Matt Ledger	Kyosho Lazer ZX-R	Reedy Mr. O	Novak MXc	KO Propo	Reedy
7	8	Doug Laurent	Yokomo	Magnum 13	Novak M5	Airtronics	Reedy
8	7	Stefan Danz	Schumacher Boss Cat	LRP Blue SE	LRP LE	Futaba	LRP
9	9	James Ward	Yokomo Works	Peak Performance	Novak MXc	Airtronics	Ward's
10	10	Sean Kersten	Kyosho Lazer ZX-R	Magnum	Novak MXc	Airtronics	Super Cell

FLA CHAMPS

dominant vehicle in this class was the Kyosho Lazer (both the ZX and ZX-R versions). In the first round, leader Ledger was pursued by Hohwart and Moore. By lap two, Hohwart had relieved Ledger of the lead, and Gonzales had moved up into 3rd. At 1:55, Germany's Jürgen Lautenbach moved into 3rd and Gonzales took 2nd. The racers maintained these positions through the finish.

In the second round, Gonzales shot into the lead followed by Ledger and Moore. After 1 minute of racing, Hohwart was chasing Gonzales for the lead, and a battle for 3rd was heating up between Moore, Associated's Bret Reelfs and Magnum Motor's Sean

Kersten. Across the line, it was Gonzales, Hohwart and Reelfs.

In the final round, Gonzales put himself out front again, followed by Hohwart and Moore. Lautenbach managed moved into 2nd, but he fell back again. Moore passed Hohwart for 2nd, and that's the way it ended: Gonzales, Moore, Hohwart. Gonzales, who had only two points, was declared the winner; Hohwart took 2nd place (three points) and Moore took 3rd (six points).

Thanks to everyone who made this event such a success: the West Coast R/C Club, Team Losi, the officials, the track crew and the marshals who worked so hard (so that the racers didn't have to!). If



you're ever in the Tampa area, check out the great facilities at Lake Park. You'll be glad you did!

It was almost as busy near the concession stand as it was on the track.

Front Tires

Rear Tires

Sponsors

Losi HT	Losi HT	Team Losi, Jammin' Products, Airtronics, Novak, Trinity
Losi full-radius HT	Losi 10-row HT	Team Losi, Trinity, Novak, Victor, JR, Jammin' Products, Oakley, Tecncraft, Cow Tipplers Inc., Brigitte Peugeot & Chooch
Losi ribs HT	Losi 10-row HT	Team Losi, Race Prep, Novak, KO Propo, Competition Electronics, Mower Power
Losi ribs HT	Losi 10-row HT	Traxxas, Tekin, East Coast Mods, HPI, PTI, Team Pit Stop
Losi ribs HT	Losi 10-row HT	Team Losi, Trinity, Novak, Victor, Futaba, Jammin' Products, Oakley, Tecncraft
Losi full-radius HT	Losi 6-row HT	Team Losi, Trinity, Novak, Futaba, Tecncraft, Andy's, Jon & Joonbugs Mfg., Ronbo's Retread Svc., Jammin' Products, Ranch Pit St
Losi ribs HT	Losi X-pattern HT	Associated, Reedy, Airtronics, Novak, Yokomo, RCPS, Oakley, Team Moo
Losi full-radius HT	Losi 6-row HT	Team Losi, Trinity, Novak, Airtronics, Tecncraft, Jammin' Products, Revolution, Ronbo's Retread Service
Pro-Line	Losi	Associated, Reedy, Airtronics, Novak, Pro-Line, RCPS, Oakley, Team Moo
Losi full-radius HT	Losi 6-row HT	Team Losi, Trinity, Novak, Oakley, KO Propo, Tecncraft, Kevin-Kevin Motor Lab, Ronbo's Retread Service, TLPP, Brigitte & Travis

Front Tires

Rear Tires

Sponsors

Losi ribs HT	Schumacher pins	Associated, Reedy, Airtronics, Novak, Pro-Line, RCPS, Oakley, Team Moo
Losi ribs HT	Jammin' Step-pins HT	Team Losi, Trinity, Novak, Airtronics, Tecncraft, Jammin' Products, Jon & Joonbugs Mfg., Revolution
Losi ribs HT	Losi 4-row HT	Peak Performance, Associated, Kyosho, Novak, Airtronics, Team Orion, RCPS, ERP, Power Source
Losi ribs HT	Losi 4-row HT	Associated, Reedy, Novak, Airtronics, Yokomo, RCPS, Kimbrough, Team Pit Stop, Team Waldo
Losi HT	Traxxas stock	Traxxas, Peak Performance, Airtronics, Novak, MIP
Losi ribs HT	Losi 4-row HT	Associated, Reedy, Airtronics, Novak, Yokomo, RCPS, Oakley, Team Moo
Losi ribs HT	Jammin' Step-pins HT	Team Losi, Trinity, Novak, Victor, JR Radios, Jammin' Products, Oakley, Tecncraft, Jon & Joonbugs Mfg., Kevin-Kevin Speed Shop
Losi ribs HT	Kyosho mini pin HT	Twister, Kyosho, Novak, Max-Cell, MIP
Losi ribs HT	Losi 4-row HT	Associated, Reedy, Novak, RCPS, Pro-Line, Power Source
Losi ribs HT	Losi 4-row HT	Reedy, Associated, Turbocharger, RCPS

Front Tires

Rear Tires

Sponsors

Losi ribs HT	Losi 4-row HT	Team Losi, Twister, Futaba, Lunsford, M-n-M Hobbies
Losi 6-row HT	Pro-Line 7100 HT	Team Losi, ERP, Magnum Motors
Losi ribs HT	Losi 4-row HT	Team Losi, Bud's, Power Push, Hobby Stop West
Losi ribs HT	Losi 4-row HT	Associated, Reedy, RCPS, Lunsford, Tekin
Losi ribs HT	Jammin' Step-pins HT	Team Losi, Team Loupe's, ERP
Losi ribs HT	Losi 4-row HT	Team Losi, Max-Cell
Losi ribs HT	Losi 4-row HT	ERP, HRS Speed Systems, Twister
Losi ribs HT	Losi 4-row HT	Turbo Schacht Racing Cells, ERP, CAM
Losi ribs HT	Losi 4-row HT	Hurricane Batteries
Losi ribs K	Losi 4-row HT	New Wave Cells, Queens Off-Roaders, Top Qualifier R/C Center, Class Recreational Products

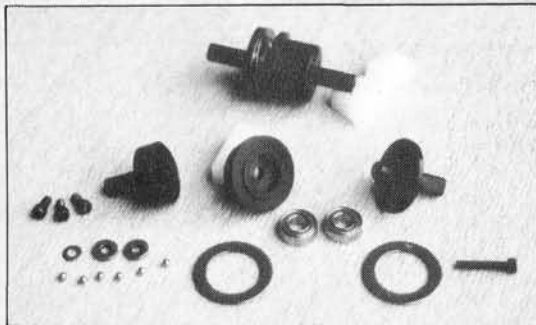
Front Tires

Rear Tires

Sponsors

Losi 4-row HT	Losi 4-row HT	Peak Performance, Associated, Kyosho, Novak, Airtronics, RCPS, Team Orion, ERP, Power Source
Losi 4-row HT	Losi 4-row HT	Peak Performance, Kyosho, Novak, Team Orion, Futaba
Losi 4-row HT	Losi 4-row HT	Twister, Kyosho, Novak, Max-Cell, MIP
Losi 4-row HT	Pro-Line	Associated, Reedy, Novak, Kyosho, RCPS, Pro-Line, Turbo Cells, Power Source
Losi 4-row HT	Losi 4-row HT	LRP, Schumacher
Losi 4-row HT	Losi 4-row HT	Kyosho, Associated, Reedy, Novak, Tecncraft, Turbocharger, RCPS
Losi 4-row HT	Losi 4-row HT	Associated, Magnum, PSE, McTureos Rooming
Losi 4-row HT	Losi 4-row HT	LRP, Schumacher
Traxxas med.	Traxxas med.	Yokomo, Traxxas, Ward's Racing Products
Losi 4-row HT	Losi 4-row HT	Magnum Motors

SPEED SHOP



STEVENS & SON

Intimidator/Enforcer Replacement Diff

Made of 7075-T6 aircraft-grade aluminum, this durable, hard-anodized diff is designed to replace the stock diffs used in 2WD dirt-oval and sprint cars. It's as strong as a steel diff, yet 65 percent lighter, and it's produced on precision, computer-controlled machinery, so it won't bind in the turns. It comes with everything you need except a spur gear. (Aluminum outdrives are also available.)

Part nos. SS91001 (diff); SS91004 (outdrives).

Prices: \$79.95; \$12.

For more information, contact Stevens & Son R/C Products, 9820 Indiana Ave. #15, Riverside, CA 92503.

RPM

RC10 Team Car Rear-End Kit

RPM now offers a complete Team Car rear-end setup for the RC10. Like the '91 Worlds front-end kit (part no. 7077), it uses a narrowed chassis and arms that are longer by $\frac{5}{16}$ inch. It comes with a precision-molded drill-fixture pattern; a pair of inner hinge pins; two pairs of inner mounting blocks that provide 1.5 or 3 degrees of toe-in on each side; a pair of specially designed bearing carriers that maintain the proper camber settings; and all the necessary hardware. (Note: to accommodate these arms, your RC10 must have a Stealth tranny.)

Part no. 7079

Price: \$19.95

For more information, contact RPM Custom Engineered R/C Products, 14978 Sierra Bonita Ln., Chino, CA 91710.



DURATRAX

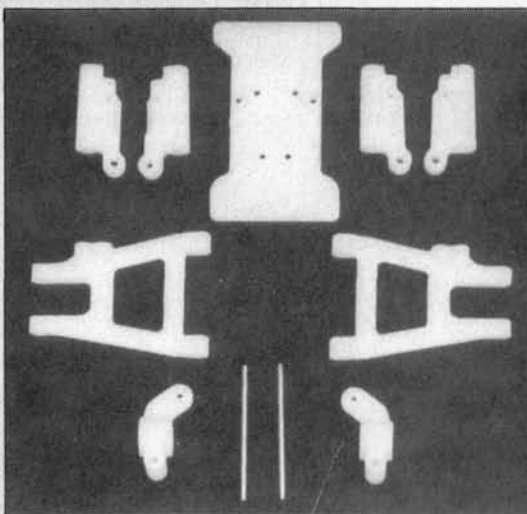
Powerline Motors

Team Duratrax's machine-wound Powerline Motors offer you race-ready performance. Available in monster-truck, 2WD, 4WD and on-road versions, they have 4.9mm wet magnets, 1.3mm cans, a heat-sink endbell (to keep them cool), ball bearings at both ends, high-silver-content brushes and diamond-trued commutators. For smooth performance, their armatures are machine-wound, balanced and epoxied into place. They have adjustable timing and come with capacitors.

Part nos. DTXC3110; DTXC3120; DTXC3130; DTXC3140.

Price: \$44.95

For more information, contact Great Planes Model Distributors, P.O. Box 9021, Champaign, IL 61826.



Descriptions of the products shown on these pages were derived from press releases supplied by manufacturers and/or their advertising agencies. The information given is neither an endorsement of the product by *Radio Control Car Action*, nor a guarantee of performance or safety. If you write to the manufacturer about any product described here, be sure to say that you read about it in *Radio Control Car Action*.

HPI

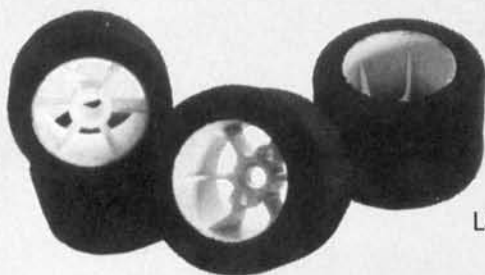
1/10-Scale Jaguar XJR14

HPI's sleek new Jaguar XJR14 body will improve your 1/10-scale on-road car's stability and make it more maneuverable.

Part no. 7000

Price: \$20

For more information, contact
Hobby Products International,
22600-C Lambert St., Ste. 904,
El Toro, CA 92630.



BOLINK

1/12-Scale Black Dot Tires

Bolink now offers its Black Dot tires in 1/12 scale. Made of a very durable compound, they come glued and trued on standard wheels.

Part nos. BL-3003 (fronts); BL-3143 (rears).

Prices: \$15.95; \$22.95.

For more information, contact Bolink Inc., 420 Hosea Rd.,
Lawrenceville, GA 30245.



S&K

Battery Spine

The battery pack will never fly out of your RC10 or RC10T again! Just snap S&K's battery T-bar spine into place over the original battery box.

Part no. SKBS18

For more information, contact S&K, 215
S. Market St., Oskaloosa, IA 52577.



ERP

JR-X2 Ceramic Diff Balls

ERP's ceramic diff balls are as smooth as glass and much harder than carbide. They have a lower rotating weight and, with proper maintenance, they should last forever. The kit includes 12, 3/32-inch-diameter balls and eight 1/16-inch-diameter balls for the diff and the thrust bearing.

For more information, contact Endurance Racing
Products, 826 N. Lamb, Las Vegas, NV 89110.

TEKIN ELECTRONICS

TFM Receiver

Tekin's TFM Micro Receiver is the smallest (1.2x1.2x0.57 inches), lightest (13 grams), most advanced FM receiver available, and it's compatible with all existing FM radio systems. Its features include: an AM jitter filter; a four-element IF (intermediate frequency) filter; a double-pole audio filter; and the exclusive AGC (automatic-gain-control) circuit. The TFM receiver is more sensitive than most, so it provides an extended radio range. It's available for 27, 29, 35, 40 and 75MHz systems, and it uses the same crystals as your current radio.

For more information, contact Tekin Electronics Inc., 970 Calle Negocio, San Clemente, CA 92672.



AUTOSCORE

The ultimate race scoring and race management program

- Menu driver - user friendly
- Quickly resolves frequency and number conflicts
- Sets up heats and mains in minutes
- Scores all qualifiers and mains by racer's name
- Will score up to 10 qualifiers and 1 main for each racer
- Can handle up to 1000 racers in 30 classes
- Prints complete standings by name or position
- Positions, lap times and speeds continuously displayed
- Runs on IBM pc or Compatible
- Only \$250, PRO version \$450
- Can be used with the AMB scoring system
- 1/4 scale version also available

AUTOSCORE IS THE VERY BEST

You can customize the program to your race format. It has been designed and modified over the years to handle all race conditions. You will not find a better program on the market. Call or write for a FREE demo disk and check it out for yourself.

B & B Software - 2146 Palomar Ave
Ventura, Ca 93001 (805) 643-2042

RADIO CONTROL RACER

HOT TRACKS



CEDAR RAPIDS R/C RACEWAY, CEDAR RAPIDS, IA

CEDAR RAPIDS R/C Raceway in Cedar Rapids, IA, is a new, high-banked, asphalt oval for 1/4- and 1/10-scale cars. From the 10-foot-high drivers' stand, you can clearly see this super-fast track. With its 15-degree corners and 10-degree banked straights (20 and 30 feet wide, respectively), racers have achieved times in the 5.30s! The track has a 300-foot center line with 100-foot straights, and the pit lane is 10 feet wide.

This summer, the Raceway is holding a 16-race points series—with four "throw-outs" and a \$1,500 purse—for 1/4-scale cars. There's a \$15 entry fee, \$5 of which goes into the points fund.

QSAC races are also being held with Sportsman, Grand National, Spring and Modified classes. (QSAC membership is required.)

For 1/10-scale car buffs, races are held every Thursday night under great lights! Saturday and Sunday races are also part of the schedule; call for details.

Just off I-380, the track is one mile south of Hawkeye Downs on 6th St. SW (behind Storm Steel). For more information, call Gary Gallo at (319) 362-4561 before 3:30 p.m. or Dave Giannetto at (319) 362-4709 after 5:30 p.m. (Central Time). ■

Here's another in our "Hot Tracks" series of outstanding R/C racecourses. To see your favorite track featured here, send some sharp black-and-white photos and a description of its delights (approximately 500 words) to: "Hot Tracks," Radio Control Car Action, 251 Danbury Rd., Wilton, CT 06897.

TECH-TOYS®

SPEED SHOP for R/C MOTOR SPORTS

RADIO CONTROLLED

GAS and ELECTRIC
(1/4, 1/6th, 1/8th, 1/10th, 1/12th Scales)

Cars · Boats · Planes · Helicopters

- AREAS LARGEST PARTS SELECTION
- COMPLETE PROFESSIONAL SERVICE DEPARTMENT
- EXOTIC PLASTIC AND METAL STATIC MODEL CAR KITS
- UNIQUE AUTO ENTHUSIAST GIFTS
- RACING COLLECTIBLES

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Everything for the NOVICE and the Experienced Modeler.

A Complete Body Shop to Create a Concourse Winning Design.

Visit our **HUGE RETAIL SHOWROOM** or **CALL** with your **MAIL ORDER**

— We service all 50 states, Puerto Rico, Military Bases and beyond —

We Accept Visa, Master Card, Discover & COD
Visit us in person and use your MAC CARD

We're Experts in Radio Control who sell the best products in the business.

TECH-TOYS®

— OPEN 7 DAYS —

370 Rt. 46 W., Parsippany, NJ 07054
Tel: 201-227-7012 • Fax: 201-227-5032

HOW TO: Race truck tuning

Dialing for dirt

by FRANK MASI



THE RECENT racing-truck popularity surge has made this fairly new class of off-road racing more competitive than ever. Prior to this "boom," truck racing was thought to be more a novelty than a serious racing class. When Team Losi introduced its JR-XT racing truck, racers discovered the fun and excitement that trucks had to offer. The large tires used on these stadium racers "flattened" the bumps and jumps of off-road tracks.

Soon after the release of the JR-XT, other manufacturers began offering racing trucks to compete in this burgeoning new class. Traxxas, Kyosho and Team Associated have all boarded the truck racing bandwagon.

Race-truck owners have a lot to consider when they set up their machines. Truck racing is just as high-tech as any other serious form of racing, and drivers know that dialing-in is essential if they want to remain competitive.

Tuning a race truck is very similar to tuning an off-road car, although many people seem to think that a completely different approach is necessary.

SUSPENSION

The suspension—in this case, I'm referring to the shocks and the springs—is the most important tuning factor in any type of off-road racing. Improper suspension settings can result in poor handling and longer lap times.

Usually, "shock" means an oil-filled, coil-over shock. It consists of two major components: the shock body (hydraulic reservoir) and the shock spring, which provides resistance to the com-

pression of the shock and enables the shock to rebound after it has been compressed.

Damping is the speed at which the shock operates, or the amount of resistance against the shock's action. Two factors affect the damping of a shock: the piston and the viscosity of the damping fluid (shock oil). I recommend that you use a lightweight shock oil with a shock piston that has small valving, i.e., holes or slots, in it. The thinner shock oil passes through the piston more easily and is less likely to be trapped when the shock is compressed quickly, e.g., when the truck lands after large jumps.

A truck's damping should be a little heavier than that of a regular off-road car. Most racing trucks are designed with extra-long A-arms, and the shocks are mounted so that the suspension arm provides them with more leverage. That's



For cornering, caster helps to keep as much of the front tires in contact with the track as possible during chassis roll. Notice how, as the tire pivots, the caster changes the tire's angle to the ground.

why you should start using shock oil that's slightly heavier than what you'd use in an off-road car.

When you select a spring to use on a racing truck, keep in mind that its "unsprung" weight, i.e., the weight of all the components that aren't supported by the vehicle's suspension, is greater than that of an off-road car, so heavier springs are desirable. Also, heavier springs will minimize chassis roll and make the truck more responsive to driver input, braking and acceleration.

STATIC ADJUSTMENTS

There are several front and rear tire attitudes that you can adjust to change the truck's handling characteristics. These adjustments consist of caster, camber, toe-in/toe-out and ride height. Always make static adjustments with the truck "race-ready," i.e., with its batteries and motor installed.

• **Caster.** The steering block pivots on an axis; caster is the degree to which this axis is tilted backward. (Actually, this is negative caster; positive caster exists if the pivot axis is tilted forward, but that's not desirable in auto racing.) Negative caster varies throughout the wheel's range of steering movement, and this changes the angle at which the tire contacts its running surface. When a truck takes a corner, gravity and inertia cause its chassis to tilt (roll) toward the outside of the corner. When this happens, its tires lean, too. Caster realigns the tires so that they remain more perpendicular to the ground when the

Race truck tuning

chassis rolls. As you know, a tire has more traction when it has more contact with the ground. The more negative caster a truck has, the more steering it will have when the most chassis roll occurs—generally during high-speed cornering or heavy braking.

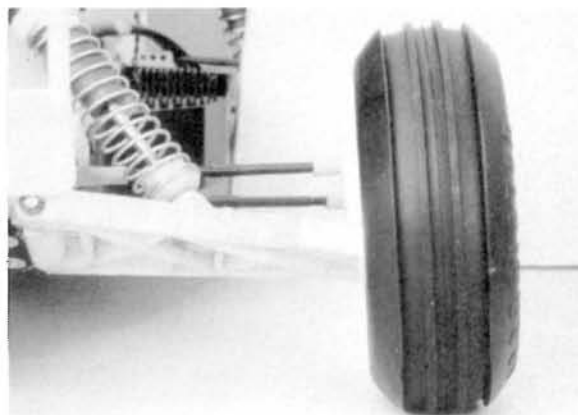
● **Camber.** A stationary vehicle with its tires perpendicular to the ground has 0 degrees of camber. If the tops of its tires lean inward (toward the chassis) 2 degrees, then the vehicle has 2 degrees of negative camber. If the tops of its tires lean 2 degrees outward, it has 2 degrees of positive camber.

Set your racing truck with 1 to 2 degrees of negative camber. This will give it a little more “on-power” steering and prevent it from being “darty” (difficult to keep on a straight course) on rough sections of the track. Negative camber will also help to prevent “traction rolling” and allow the truck to enter rough turns more aggressively. In the rear, start with about 1 degree of negative camber. The more negative

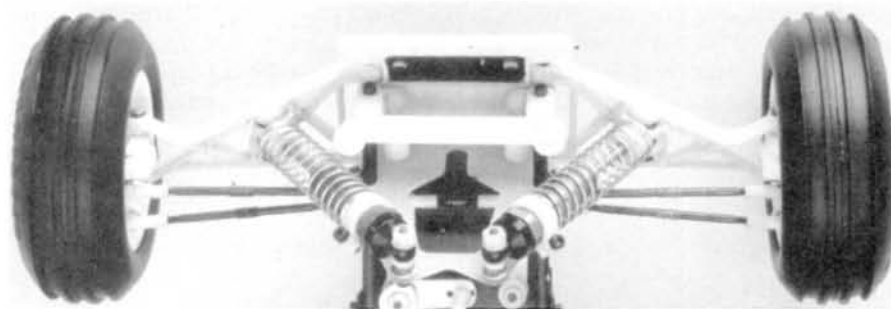
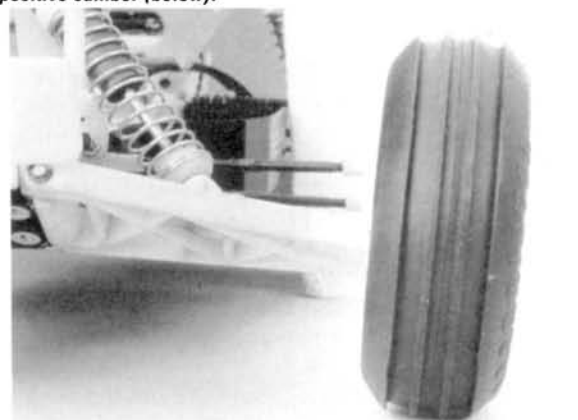
camber a truck’s rear wheels have, the more contact area its tires will have with the ground when the vehicle corners. This will give the truck more traction entering and exiting corners. If your truck seems to be pushing, reduce the amount of negative camber in the rear. This will make the rear tires lean onto their edges in corners, reducing their traction and bringing the rear of the truck around.

When you make these adjustments, it’s important to remember that moderation is the key to success; make gradual changes.

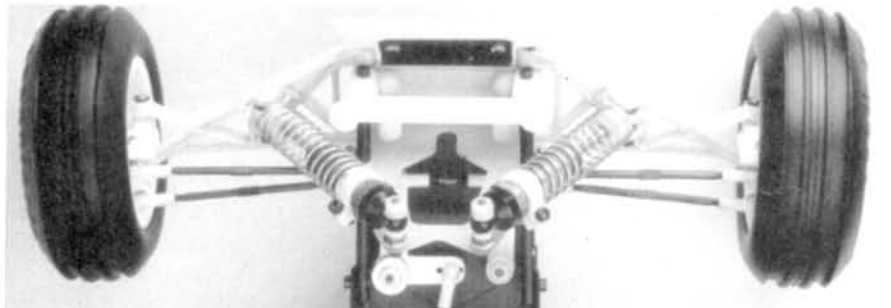
● **Toe-in/Toe-out.** Toe adjustment greatly affects the steering characteristics of a truck. If a vehicle has



A wheel has negative camber when its top leans toward the vehicle (above), and positive camber when it leans away. This wheel has positive camber (below).



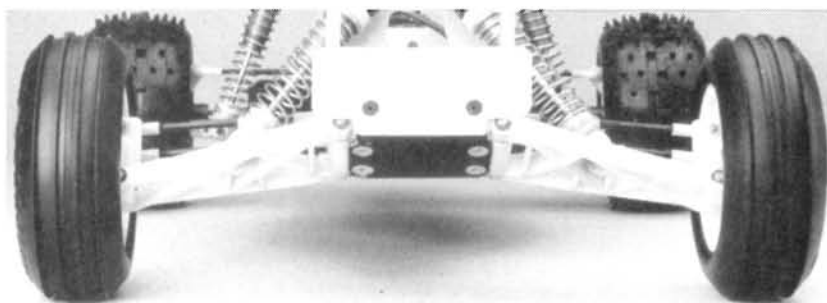
Toe-in will help minimize your truck's oversteer and improve its straight-line stability.



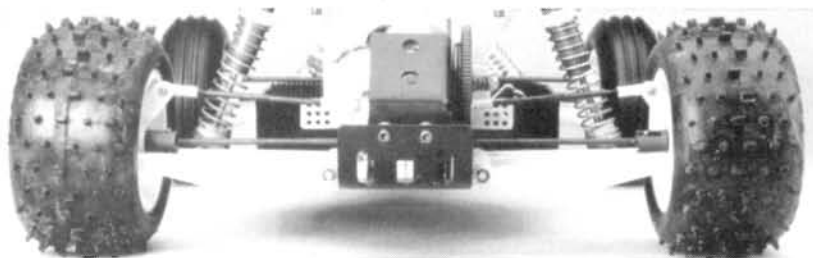
Toe-out allows you to steer the truck into the turns more aggressively.

0 degrees of toe, its front wheels are pointing straight ahead, parallel with each other. If it has toe-in, its front wheels are aiming at an imaginary point somewhere ahead of the vehicle. Toe-out is the opposite. Generally, a truck shouldn't have more than 2 degrees of toe-in or toe-out. Try to set the front wheels for 0 degrees. A little toe-out will help you steer the truck into the corners a little more aggressively. Toe-in will improve the truck's straight-line tracking and keep it from oversteering (spinning out) when exiting turns.

● **Ride Height.** Adjusting the ride height is a tuning step that's often overlooked, but can be very beneficial. The higher the truck's front end, the less low-speed steering it has. Lowering its front ride height will enable it to enter corners better. A ride height that's too low, however, will hamper the truck's jumping ability and affect its straight-line stability. Rear ride height is equally crucial to the truck's steering and rear



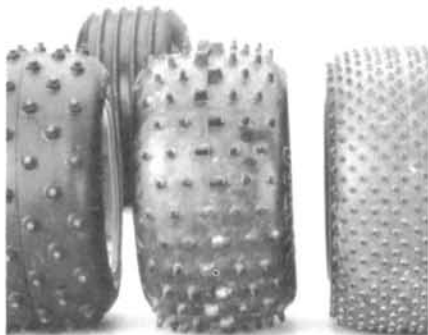
Often overlooked, a vehicle's ride height can dramatically affect its performance. Start with the front A-arms slightly above parallel (above), and set the rear drive shafts so that they're parallel to the ground (below).



traction. Setting the rear of a truck high will give the front tires more grip, but the rear tires will tend to unload faster and lose their grip. Running the rear end low will give the rear tires more bite and take away a little steering.

TIRES, MOTOR AND BATTERIES

● **Tires.** No matter how good your suspension is, without the right tire combination, your truck's performance will falter. The surfaces of off-road tracks are as varied as snowflakes. As a guideline, ribs or staggered ribs should work well up front on most track surfaces. If you need more steering, do what Jack Johnson did on his '91 ROAR Truck Nats winner: trim off the two outermost ribs on a pair of ribbed tires (he used Team Losi HT ribbed tires). As a result,



No amount of chassis tuning will help unless you have the right tire combination. Choosing tires that work on your track requires knowledge and patience. To start, pay attention to which tires work for others.

more of the truck's weight was concentrated on the remaining ribs, giving the tires more traction.

Rear tire selection should be based on the softness of the track's surface. Hard-packed surfaces require the use of mini-pin spike tires; on a combination of hard- and medium-packed dirt, larger-spike tires that have been cut down work well. For soft, fluffy tracks, most racers rely on large-spike tires to penetrate the surface fully. To find out more about off-road tires, see the article "Tire Tech" in the January issue of *Radio Control Car Action*.

● **Motors and Batteries.** Try using 1400mAh SCR cells. Most pros use six cells, even in the modified classes, so I doubt that you'll need seven cells to remain competitive.

Any 16- to 19-turn motor is a good place to start. Don't use one with fewer turns, because the large diameters of the truck tires won't allow you to fully utilize a high-rpm motor. If you plan to run 1700mAh SCE batteries, you can use a 14- or 15-turn motor, but most truck racers tend to over-power their vehicles. Go easy on the horsepower. Instead, try to focus on driving a good line. You may not kick up a lot of dirt, but I guarantee that you'll be faster on the clock. If you arm yourself with knowledge, and practice as much as you can, you're sure to be successful. ■

Attention Race Promoters

Introducing **Race Space**TM

a special
advertising
section in
**R/C Car
Action
magazine
for events
and races.**

**Special
Rates!**

Race promoters, you can now take advantage of *Car Action's* massive selling audience and distribution by advertising your next race in our special advertising race section - **RACE SPACE**.

RACE SPACE will ensure that your ad reaches the largest possible racing audience - 20 times larger than the so-called race magazines. As an added bonus, we've worked out special rates and ad sizes just for you.

MAXIMIZE YOUR RACE EXPOSURE WITH AN AD IN RACE SPACE.

Call Kurt, Mike, Sharon, or Steve at

(203) 834-2900

for special rate information
and a media kit.

Fax: (203) 762-9803.

Next available issue:
September, 1992

Space reservations due:
May 27, 1992

Material due: June 2, 1992

On sale: July 28, 1992



Car Action Race Space
251 Danbury Road
Wilton, CT 06897

California Dreamin'



MANY STATIC MODELS enable you to customize the car to the kit to suit your taste. Whatever you want—stock, showroom, or “street and strip”—the look is up to you. Kyosho’s* Chevy Sport Truck gives you these choices, too. It’s a custom R/C truck, so let your imagination run wild.

Based on the popular Chevy S10 pickup, the details on this hot little truck are amazing—right down to the windshield wipers and the dual door mirrors. Your customizing options also include a windshield visor, a bed wing and a selection of wild neon graphics to match your radical colors scheme. If the stock street look is your bag, factory graphics are also part of the decal set.

The performance-proven Ultima II chassis and drive train give the 2WD Sport Truck the potential to be the hottest performer in the neighborhood. Under the Chevy S10 Lexan body, you’ll find the Ultima II’s Kelron twin-plate chassis with a four-wheel independent suspension in which all components have been glass-reinforced. A set of oil-filled Kelron shock

absorbers provides good on- and off-road handling.

The gearbox includes an Ultima gear-type differential that’s totally sealed to protect it from dust and dirt. Power is supplied by the included Le Mans stock motor and controlled by Kyosho’s reliable rotary speed controller. You can use either stick- or saddle-pack battery packs—an example of the truck’s versatility.

ASSEMBLY

Assembly is easy, thanks to one of the most complete manuals Kyosho has ever produced—a 28-page guide that includes an extensive cross-referencing chart for replacement parts and optional performance parts. The manual starts with a brief expla-

by FRED MURPHY

KYOSHO

KYOSHO

KYOSHO

KYOSHO

JULY 1992 11:

SPECS

Manufacturer Kyosho
Type 2WD sport pickup
Scale 1/10
Price \$219.95

DIMENSIONS:

Overall Length 14.5 inches
Width 9.5 inches
Wheelbase 11.1 inches
Front Track 8 inches
Rear Track 8.2 inches

WEIGHT:

Gross (with battery) 55 ounces

BODY:

Type S10 Chevy truck
Material Lexan

CHASSIS:

Type Flat pan
Material Kelron

DRIVE TRAIN:

Primary Pinion/spur
Transmission Gear
Differential(s) Bevel gear
Bearings/Bushings Metal bushings

SUSPENSION:

Front/Rear: Type A-arm with upper control arm
Damping Oil-filled, coil-over shocks

WHEELS:

Front/Rear: Type One-piece plastic
Dimensions 2.1x1.3 inches

TIRES:

Front/Rear Low-profile tread

ELECTRICS:

Motor Le Mans 05 stock
Battery 6-cell stick pack*
Speed Controller 3-step forward/reverse

OPTIONS AS TESTED:

Futaba Magnum radio system; Kyosho 6-cell 7.2V racing pack.

COMMENTS:

The Sport Truck is extremely versatile. You can create anything, from a complete California low-rider to an off-road competitor with this true, custom kit in a box. The Sport Truck's performance is moderate in its stock versions, but by using the Ultima II chassis as a base for this truck, Kyosho has made upgrading easy and very rewarding. The truck's performance and the pleasure it provides will be limited only by your imagination.

*not included



Based on the race-proven Ultima II chassis, the adjustable Chevy Sport Truck performs well whether it's cruising in its "low-rider" setup or taking rigorous off-road jaunts.

nation for first-time builders and a section of tips and precautions to help you avoid common building errors. Then you'll learn about the kit's metric nuts and bolts and correct radio-operation procedures. This is very good information for R/C builders of all levels.

Build the shocks; assemble the gearbox, the suspension arm and the steering; install the radio, the speed controller, the servo, the motor and the pinion gear; then detail the body. The entire process is completed in 41 steps. You'll probably spend more time deciding how to customize your truck than you will assembling it! The manual also includes information about basic maintenance and suspension and performance adjustments.

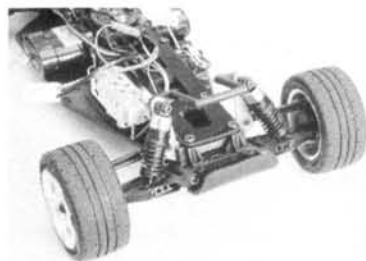
SPORTY PERFORMANCE

Now that you've completed the assembly, hit the street! The Bridgestone replica radials aren't just a nice touch; their treads provide excellent traction on dry asphalt, concrete, sand and loose dirt.

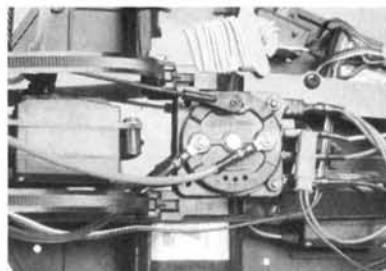
The stock 15-tooth pinion gear and 05 motor give the Sport Truck adequate street speed, but the Ultima II drive train can easily handle more power. Simply upgrade the motor and change pinion gears, and you'll be making dust for the competition to eat.

If you want to run the truck in its "low rider" configuration, you'll have to sacrifice quick steering response and a smooth ride. You can, however, adjust the height of the Sport Truck's suspension to create a full-blown performance warrior. By adjusting the shock positions, you can

CHEVY SPORT TRUCK



The front shocks were repositioned to create this low-slung appearance. A fully independent front suspension makes the most of the wide, scale, "treaded" tires.



Kyosho's excellent rotary speed controller is included with the Chevy Sport Truck. If you want the extra performance of an ESC, there's ample room in which to mount it.



A powerful Mabuchi 540 motor (included) transfers power to the Sport Truck's transmission. The rear shocks are positioned to keep the chassis as low as possible.

make your Sport Truck an off-road conqueror on the weekends and a hot street machine during the week. The versatility of this design is impressive.

The Kyosho Sport Truck should give all of us "weekend warriors" the best of both worlds—style and performance. Good luck and happy motoring!

**Here's the address of the company that's featured in this article: Kyosho; distributed by Great Planes Model Distributors, P.O. Box 9021, Champaign, IL 61826.*

NOT JUST ANOTHER PRETTY FACE



"All of my products have extensive research and development behind them to be truly new and innovative."

Dan's Motor Spray and Banana Lube are non-toxic and will not melt plastic parts.

The Banana Lube provides great long-lasting lubrication.

Send \$3.00 for Catalogue and Decals

BANANA LUBE #10019



MOTOR SPRAY #10010



DAN'S RC STUFF
9525 COZYCROFT AVE. #C
CHAATSWORTH, CA 91311

Dan's new battery bars are designed for easy use and high conductivity. They're even gold plated for non-corrosion.

Great ideas like these, plus motor-homes, body foams, Dan's stands, and more, make the choice of Dan's RC stuff the right choice.



"GOLD BARS" #10027

"NOW WE'RE HAVING FUN"

PHONE: (818) 700-6912
FAX: (818) 700-2940

RADIO GEAR

(Continued from page 90)

CAPACITOR INSTALLATION

With a file or sandpaper, remove the plating from the motor can where the capacitors will be soldered. Use a soldering iron with at least 60 watts (for this purpose, the hotter the iron, the better). Heat the iron and then apply a dab of rosin-core solder (never use acid-core on electrical joints) to the tip to improve heat transfer. (This process is called "tinning.") Keep the iron on the joint until the joint is hot enough to melt the solder. Touch the solder to the joint, not to the iron, and use as little as possible. If this area isn't hot enough to melt the solder, the joint won't be very solid. Hold everything steady until the joint cools, and trim the leads if they're too long when you've finished. A good joint is smooth and shiny without any lumps, rough edges, bubbles, or whiskers.

When you're satisfied with your soldering, check that the motor will fit in your car and that its wires and capacitors won't contact any surfaces that might cause them to short out. Hook up your speed controller and battery and then go have some fun. If you learn how to use motor capacitors, you'll spend less time worrying about RF interference and more time enjoying R/C!

**Here are the addresses of the companies mentioned in this article:*

Jameco, 1355 Shoreway Rd., Belmont, CA 94002.
JDR Microdevices, 2233 Samaritan Dr., San Jose, CA 95124.

TIRE-TRUING

(Continued from page 89)

nut. Drop a plain washer over the screw, and install the cutting arm with a flat washer, a locking washer and a no. 10 wing nut. Install another no. 10 screw on the other end of the slide. Slip an antenna tip over the end of the screw; this will act as a handle.

Attach the top half of the slide to the bottom part, which has already been attached to the base. Adjust the head so that it just touches the rear wheel. Draw the head across the wheel, and adjust the slide until it's running parallel with the wheel. Tighten down the slide. Put a self-sticking Radio Shack rubber foot on each corner of the underside of the base, and you've finished.

LET'S CUT SOME FOAM!

Now, the fun begins. Mount a rear tire on the axle and connect a 6- or 7-cell battery pack. Turn on the pod for a minute to see

(Continued on page 126)

Cats West Schumacher



**We Did it With Kits! - NOT One-Off Prototypes!!!
You Too Can Win with a Schumacher! Call Us!!**

Team Spec - Cougar II Worlds Warm-Up Winner!!

ALL NEW!! Storm Racing Truck!! Green Tires!!

Worlds Spec - ProCat!! Lowest Prices!!!

LRP Motors 9 AM - 4 PM M-F 510 779-1665

Schumacher Parts & Kits 1310 Noia Ave.

Hawk's Racing Batteries Antioch, CA

Always IN STOCK!!! 94509

Call for Tuning Secrets!

ATTENTION TRACK OWNERS & CLUBS

Don't run another race without the **LC-1000**

This is the lap counting system your organization has been looking for.

WITH THE LC-1000 THE REAL WINNERS GO HOME WITH THE TROPHIES AND YOUR RACERS WILL KEEP COMING BACK BECAUSE THEY KNOW THE LC-1000 IS A LAP COUNTING SYSTEM THEY CAN COUNT ON.



Call your races like a pro with the on-screen clock, audible start/finish cues and lap count info displayed in lead car order. Quickly review complete race statistics including MPH and all lap times for up to ten cars. The LC-1000 resolves protests with quick lap count verification. Print all results, including lap times. Run this totally portable system the entire race day on a 7.2V pack. Only \$695 with EZ-Stick numbers and EZ-Format racing forms. Optional wired remote pushbuttons \$7.95 ea.

For more information or to order your LC-1000 call or write (301) Neron Associates, P.O. Box 348 Germantown, MD 20875 972 0397

Radio Control Car Action

BACK ISSUES

**INFORMATION
PACKED!**



JUNE '92

FEATURES: Car Action's Car of the Year; Andy's Pro Race Kit; Wide vs. Narrow; 1991 NR/CTPA Worlds; NORRCA On-Road Nats; Install Radio Gear, Part II; Novak Digi-Peak Chargers; Inside Joel Johnson's Cleveland Winner; Superspeedway Shootout II; Start Me Up!
TRACK REPORTS: Kyosho 4Runner; Mugen Super Sport; Tamiya Nissan Skyline GT-R.



MAY '92

FEATURES: Car Action's Top 10: Cars, Readers' Rides, Drivers, Accessories, Hop-Ups, Pit Tips, Tracks, Still More Top 10; Competition Electronics Turborthirty; Dirt Oval Champs; Install Radio Gear, Part I; Cleveland Indoor Champs; Reedy Race of Champions; Make an External Battery Pack; ERP Master Zapper.
TRACK REPORTS: Schumacher Cougar II; S&M Cobra SS; Tamiya Super Astute.



APRIL '92

FEATURES: TD Enterprises Pit-Box II; Car Action Interview: Masami Hirasaka; Thompson Electronics Motor Master Dyno; Inside Masami's '89 Stealth Car; Get Started in R/C, Part IV; NORRCA Carpet Oval Nats; Project Blue Eagle; Home-Built Project; ZZ Top Pocket Eliminator.
TRACK REPORTS: Team Losi JRX- Pro SE; McAllister "OO"; Royal Hyperspeed Kawasaki; Moscow Missile; Bolink LTO SS.



MARCH '92

FEATURES: 25 Top Toolbox Items; Home-Built Project: Nitro Sprinter; Kyosho 1/8-Scale World Challenge; Inside The World's Fastest R/C Car; Sky Driving. Track Directory.
TRACK REPORTS: Kyosho USA-1 Nitro Crusher; Yokomo Works '91; Kyosho Ferrari F40; Serpent Impact 10.



FEBRUARY '92

FEATURES: New for '92; Kyosho Honda NSR 500; Home-Built Project; Cobra Trackside Tire Truer; 25 Add-on Performance Parts; Project 10L Superspeedway; Welcome Home Race; Racing Servo Roundup; 1991 Roar-Legal Stock Motor Shootout; Sledgehammer Hop-Ups; Get Started in R/C, Part III
TRACK REPORTS: Traxxas TRX-1; Kyosho Lazer ZX-R; Hyperdrive Hyper 10 Cars; Associated RC12LW.



JANUARY '92

FEATURES: Reader's Ride of the Year; Time Warp: Tamiya Sand Scorchers; Home-Built Project; How to Build and Adjust Ball Diff; Aristocraft Charger; Get Started in R/C, Part II; Track Directory; 1992 Catalogue Collection.
TRACK REPORTS: Kyosho Prototype XJ-220; Schumacher Nitro 10; McAllister Fly'n "M"; TRC/Compositechcraft Lynx II Elite SS.



DECEMBER '91

FEATURES: Tech Tips; Get Started in R/C, Part I; Christmas Wish List; Gear It Up; Kyosho/Trinity 1991 IFMAR Off-Road World Champs; You Don't Have to Fight City Hall to Win; Home-Built Project; Radio Control Racer: Intro; Andy's R/C Products 1991 Roar On-Road Nats; Speed Shop; Post-Race Maintenance; How to Build a Diffmeter; Hot Tracks; Track Directory.
TRACK REPORTS: Bolink '91 Sport; Custom Works Intimidator; Team Losi Junior T; Serpent Tenforce.



NOVEMBER '91

FEATURES: Home-Built Project; Tekin Pro Dyno; Battery Blowout; Riding the Airwaves; Dynamic Damping; Radio Control Racer: New Section; 1991 TRC/Trinity ROAR Paved Oval Nats; IFMAR World Champs Cars; Car Action Interview: Cliff Lett; Project Lazer; Speed Shop; Track Directory; Associated RC10T Stadium Truck.
TRACK REPORTS: PB Sizzler; Parma Hemi Coupe.

OCTOBER '91

FEATURES: Keep Your Stocker Screamin'; World Champs Update; Home-Built Project: Pocket Racer; SP-10 Updates; Zero-Loss is Boss; Body Detailing; Project Bulldozerhead; West Coast Monster Race; Shinwa Operate.
TRACK REPORTS: Kyosho Testarossa; Kyosho Triumph; Pirate M1; Parma Days of Thunder; Corally SP-12.

JUNE '91

FEATURES: Interview: Gil Lasi, Jr.; Project King Cab: Heavy Metal Conversion; Car Of The Year; RC10 Tranny Makeover; Electric Flight Explosion; 20 Hot Motor Tips; Basics Of Glow Engines; MK Engineering Magnum.
TRACK REPORTS: TRC PRO 10 Sport; McAllister MX-PRO; Kyosho Turbo Ultima II.

DECEMBER '90

FEATURES: Christmas Wish List; Inside Cliff Leff's Winning Cars; Speedworks Sportman's Cup; Mad-cap Truck Conversion; Houge RC10 Conversion; NORRCA Off-Road Nats; ROAR Off-Road Nats; Catalogue Collection; Build a T-Bucket; Off-Road Wheel Roundup; Shock Waves.
TRACK REPORTS: Associated RC10 Championship Edition; Composite-Craft/TRC Lynx II Sport; Traxxas TRX-T Eagle.

AUGUST '90

FEATURES: Days of Thunder; Budget Modified Motors; Speedworks Sportsman's Cup Race; Inside Dobson's Car; Battery Dumping; Hot Rod Magazine R/C Nats; The Lavco System; Robbe Scarab; Basic Soldering.
TRACK REPORTS: Panda Stadium Racer; Hiroba Toyota Celica GT Four; Max Trax Wedge; Tamiya Thunder Dragon QD.

SEPTEMBER '91

FEATURES: Home-Built Project: Classic Camaro; Lavco Pro Dyno; Avoid the Frequency Frenzy; Trinity Slot Machine; Painting Lexan Bodies; Wroad Wrecker; Car Action '91 Thunderdrome Preview; MRP Bud Light Tunnel-Hull Racer; Competition Electronics Stockcop; Off-Road Shock Tuning.
TRACK REPORTS: Associated Team Car; Kyosho Outlaw Rampage; Traxxas Blue Eagle; Radio Review: Airtronics Caliber 3P.

MARCH '91

FEATURES: RC10 Hyperdrive; New for '91; Second-Look Series: Optima Mid; Project Lynx; Kyosho 1/8-Scale World Challenge; How To Make a Winning Concours Interior; First Look: Tamiya Bullhead; Speedworks Sportsman's Cup; NR/CTPA World Championships; MIP's 4WD RC10, Part II; MRP Miss Budweiser.
TRACK REPORTS: Kyosho Porsche 911; Schumacher Cougar.

NOVEMBER '90

FEATURES: 1990 JG Oval Nats Winners; On-Road Turbo Ultima; Project Clod Buster; Masami's Yokoma; Magic Motorsports Commutator Machine; JG YZ-10 Truck Conversion; Home-Built Project: Coca-Cola Dominator; JG Lazer Truck Conversion; Home-Made Tire Truer; Preview: Tamiya Ferrari F189; Second-Look Series: Kyosho Raider; MRC Nordic.
TRACK REPORTS: Kyosho USA-1; Kyosho Ultima II; Tamiya Saint Dragon.

JULY '90

FEATURES: Bullet Racing RC-X2; Project Master Blaster; Kyosho 1/8-Scale Off-Road Challenge; Great Planes Marine Stinger; Inside the Winning Truck; Competition Electronics Linear Turbocharger; ROAR Truck Nationals; Project 10L.
TRACK REPORTS: Kyosho Slingshot; Tamiya Egress; Associated RC10L; Team Lasi JR-X2.

AUGUST '91

FEATURES: Inside Masami's Cars; Shinwa Motor Dresser Fet; R/C Facts & Fallacies; Home-Built Project: Primadonna Clod; Body Masking; IFMAR World Champs Preview; Kyosho's New Triumph; Pro-Line Ultima II Conversion; Winter Champs Winner; Pro-Line/Car Action Cactus Classic.
TRACK REPORTS: Kyosho Penske PC-19; Schumacher RS 4X4; Traxxas Hawk; Tamiya Manta Ray.

FEBRUARY '91

FEATURES: Time Warp: Tamiya B2B Sidecar; ROAR 1/8-Scale Nats; Holeshot; RC10LTO; Kyosho Hurricane; Kali Whisper; Custom-Cut Graphics; Modified Motor Maintenance; Second-Look Series: Associated 10L; MIP's 4WD RC10, Part I; Canadian Off-Road Nats.
TRACK REPORTS: Team Lasi JRX-Pro; Tamiya Ferrari F189; Kyosho Ultima Outlaw.

OCTOBER '90

FEATURES: RoboTruck; Roar Paved Oval Nats; Roar Dirt Oval Nats Winners; Centered Energy; Bloomington Gold R/C Corvette Challenge; Trinity's New Tamper-Proof Stock Motor; Kyosho Jet Stream GP-10; Secrets of the Dominator; On-Road JR-X2; 7th Annual JG Oval Championships; Dirt-Oval Buyers' Guide; Sideways City Super 50 Speedway.
TRACK REPORTS: Traxxas Radicator; Kyosho Turbo Burns; Associated RC10 Graphite.

JULY '91

FEATURES: NORRCA/Mickey Thompson Grand Prix; Sneak Peek: Team Lasi's Junior T; Home-Built Project: Flatbed Clod; Florida Winter Champs; Fusion Speed RC10; Battery Assembly Basics; Basics Of Differentials; Project Yokoma; Time-Warp: Tamiya XR311.
TRACK REPORTS: Tamiya Tyrrell 019 Ford; Corally SP-10; Schumacher Shotgun.

JANUARY '91

FEATURES: Reader's Ride of the Year; Superspeedway Shootout—R/C Thunderdrome; Home-Built Project; Inside the Winning Thunderdrome Car; ERP Magnet Zapper; First Look: Team Lasi JRX-Pro; Connector Inspector; Five Years of Car Action; Candies, Flakes & Pearls; NORRCA Dirt-Oval Nats; NR/CTPA Truck Pulls; Hobby Lobby/Graupner Systems.
TRACK REPORTS: Tamiya Hi-Lux; Tamiya Super-G; Robbe Firefox; Maui Big Bear.

SEPTEMBER '90

FEATURES: Foot Soldier; Associated Three-Piece Rims; Interview with Joel Johnson; Project Indy; Hobby Dynamics Cesa Offshore Electric; Don't Be Counted Out; Home-Built Project; The Intimidator; Pro-Line JR-X2 Truck Conversion; Sassy's Tamiya 4WD Aluminum Chassis.
TRACK REPORTS: Kyosho Formula 1 Ferrari; Traxxas RTR Bullet; Composite Craft/TRC Lynx II.

**YOU'LL FIND GREAT
TIPS, HOT REVIEWS,
AND TONS OF INFO...
IN EVERY ISSUE OF
CAR ACTION!**

Send \$4.50 each (check or money order) to
Radio Control Car Action Back Issues, P.O. Box 427, Mount Morris, IL 61054.

- | | | | |
|------------------------------------|-----------------------------------|------------------------------------|-----------------------------------|
| <input type="checkbox"/> June '92 | <input type="checkbox"/> Dec '91 | <input type="checkbox"/> June '91 | <input type="checkbox"/> Oct '90 |
| <input type="checkbox"/> May '92 | <input type="checkbox"/> Nov '91 | <input type="checkbox"/> March '91 | <input type="checkbox"/> Sept '90 |
| <input type="checkbox"/> April '92 | <input type="checkbox"/> Oct '91 | <input type="checkbox"/> Feb '91 | <input type="checkbox"/> Aug '90 |
| <input type="checkbox"/> March '92 | <input type="checkbox"/> Sept '91 | <input type="checkbox"/> Jan '91 | <input type="checkbox"/> July '90 |
| <input type="checkbox"/> Feb '92 | <input type="checkbox"/> Aug '91 | <input type="checkbox"/> Dec '90 | <input type="checkbox"/> June '90 |
| <input type="checkbox"/> Jan '92 | <input type="checkbox"/> July '91 | <input type="checkbox"/> Nov '90 | |

AMOUNT ENCLOSED \$

Payment must be in U.S. funds. Foreign orders (including Canada and Mexico), \$5.00 each

Name _____

Address _____

City _____

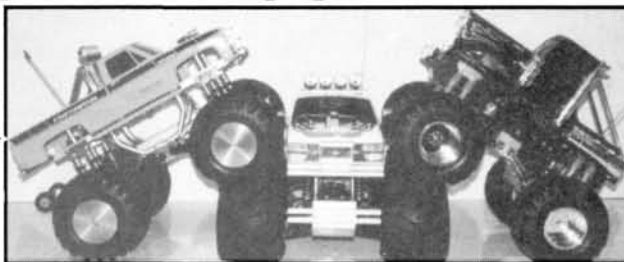
State _____

ZIP _____

Credit Card Orders, Call Toll-Free 1-800-877-5169

CLODBUSTER • USA - 1 • BULLHEAD

NEW!
CLODBUSTER
BULLHEAD
Aluminum Ladder
Frame Chassis
\$59.95



NEW!
CLODZILLA II
MULTI-LINK
SUSPENSION KIT
\$69.95

ESP MFG. - YOUR MONSTER TRUCK PARTS HEADQUARTERS

CLODBUSTER/BULLHEAD PARTS		USA - 1 PARTS	
Aluminum Ladder Frame Chassis	\$59.95	Wheelie Bar	\$24.95
Aluminum Chassis Brace	\$12.95	Aluminum Body Mounts	\$21.95
Suspension Lift Kit	\$10.95	Aluminum Skid Plate	\$10.95
Twin-Tube Lower Bumper	\$16.95	H.D. Steering Rod Kit	\$21.95
Quad Shock Mount Kit	\$24.95	Aluminum Wheels	\$74.95 pr
Front Bumper W/Brushguard	\$26.95	Chrome Wheels	\$15.95 pr
Rear Twin-Tube Bumper	\$16.95	Stainless Bearing Kit	\$59.95
Twin-Tube Roll Bar	\$36.95	40,000 RPM Racing Motors	\$69.95 pr
Light Mntng. Bar (Holds 4 Lights)	\$ 4.95	Oil Shocks	\$24.95 pr
Roll Bar Lights	\$21.95 pr	4:1 Gear Reduction	\$99.95 pr
Snow Plow Kit	\$69.95	Work/Display Stand	\$29.95
		Front Bumper	\$26.95
		Rear Bumper	\$16.95
		Frt/Lwr Bumper	\$27.95
		Rear/ Lwr Bumper	\$27.95
		Body Mounts	\$19.95
		Trk Pull Hitch	\$24.95
		Oil Shocks	\$24.95pr

ESP MANUFACTURING

20 CRYSTAL LAKE PLAZA
CRYSTAL LAKE, IL 60014
(815) 455-5440



(IL RESIDENTS 6.5% TAX) SORRY, NO CODS

SEND CHECK OR MONEY ORDER + \$4.00 S&H

OUTSIDE CONTINENTAL US and APO/FPO \$10.00 S&H

TIRE-TRUING

(Continued from page 118)

whether the tire spins true. Adjust the head to make a trial cut. Turn on the machine and start cutting slowly. Don't bog down the motor; let it cut at its own pace. After the first pass, use a pair of calipers to check whether it's cutting evenly. (You don't

have to use dial calipers; vernier calipers will work.) If one tire is "off" by a couple of thousands inch, you're OK. If it's "off" by more than that, you'll have to make another pass over it.

When you cut new tires, don't cut more than 1/4 inch at a time. It may take a couple of passes to cut fresh foam. Also, you

should round off the edges before you start to cut because the foam tends to "pull" and won't be cut evenly. I glued a piece of Dragon Skin sandpaper to a strip of fiberglass, but an emory board will work just as well. When the tire is close to the size you need, make only small adjustments to the

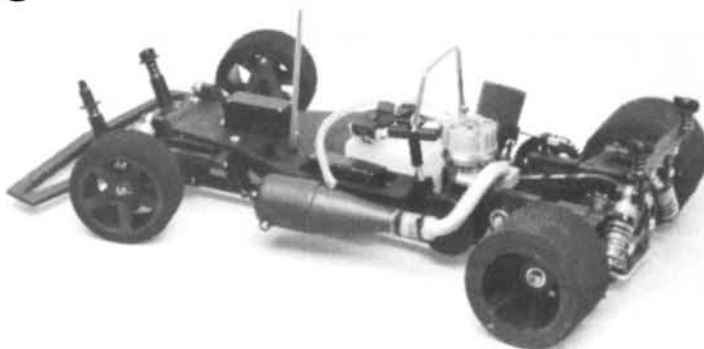
(Continued on page 134)

Impact 10

Serpent's 1/10 scale gas-powered racing car

STRONG, RELIABLE AND EXCITING

- pre-assembled rigid chassis
- independent suspension with hydraulic shock absorbers
- 1.7 cc engine with recoil starter
- high quality injection molded parts
- rear-positioned silencer
- a unique body-mount system
- easy radio installation
- low maintenance and running costs
- Audi Quattro or Nissan 300 ZX body included



(Shown with optional tuned pipe)

RCM



Go for the new Challenge in R/C Car Racing now!

R C Motor Sports of Miami, Inc • 4715 N.W. 157 St. Suite 204 - Miami, FL 33014

Telephone: (305) 620-0005 - Fax: (305) 624-1112



1 Apply long, 2-inch-wide strips of masking tape to the inside of the body (sides and hood area).



2 Using a fine-point permanent marker, draw the desired "drip" pattern on the outside of the body. Don't worry about marking both sides of the body identically. (It's unlikely that something would drip down both sides of a body in exactly the same way.)



3 Put a new blade in your hobby knife, and carefully cut the masking tape along the drawn line. Be careful not to press too hard; cut only through the masking tape—not through the body. This procedure works best if you shine light through the body. (You could hold it up to a window.)



5 With a small brush and white lacquer (or R/C finish), paint the sparkles/reflections of light on the tip of each drip.



4 After you've cut the pattern on both sides of the body, remove the tape above the cut line. Mask off any exposed area below the line, and you're ready to paint.



6 Set the air pressure on your airbrush to 15psi. Using orange paint, lightly shade along the edge of the tape. A double-action airbrush works best for this, but a single-action brush will do the job. After you've sprayed on the shading, wipe the unpainted areas with a tack cloth.

What You'll Need:

- Lexan car paint
- 2-inch wide masking tape
- Black detailing pen
- Hobby knife
- No. 11 hobby blades
- Number decals
- Airbrush setup
- Small paintbrush
- Pinstriping tape
- Tack cloth



7 Next, spray on yellow paint. Leave the center of the body clear; you'll paint it white after you've applied the yellow paint. When you apply the white paint, be sure to cover the yellow and orange sections as well. This will "back-up" those areas and prevent other colors from bleeding through. Don't forget to wipe the unpainted areas before you spray on each additional color.



Painting Truck Bodies

by
RICHARD
MUISE

Do the drip



8
After the yellow and white areas have dried for at least 1/2 hour, peel off the masking tape below the drips.



9
Now, spray black paint along the edge of the drips. After the black paint has dried, use the tack cloth to remove any overspray.



11



10

Spray on the blue paint next. Because you've backed the yellow/orange area of drips with white paint (step 7), the darker colors won't bleed through.

Peel the masking off the grill and taillights. Spray red or candy-red paint on the taillights and silver paint on the grill. I used Coverite® black pinstripping to represent the grill openings.



13



12

The last step is painting (or tinting) the windows. This should always be the last painting procedure; if you unmask and tint the windows before you apply the other colors, you'll risk having overspray show through the tinting.

Lay down 1/4-inch strips of black pinstripping along the roll bar. Here, using pinstripping on the outside of the body is much easier than masking off the roll bar from the inside.



14

Draw the grill details, hood lines, door lines and lines in the bed area on the outside of the body with a fine-point permanent marker. Cut out the wheel wells, add some numbers (I used Autographics®) and you're ready to roll!

Feel free to alter your design to suit your taste and body style. Experiment with colors and patterns on scrap pieces of Lexan before you paint your car. If you haven't the time (or the patience) to paint your own Lexan body, Rich will be happy to provide you with a "killer" custom paint job for a reasonable price.

*Here are the addresses of the companies mentioned in this article:
Motion Graphics, 2645 Robert Arthur Rd., Westminster, MD 21157.
Coverite, 420 Babylon Rd., Horsham, PA 19044.
Autographics of California, 7401 White Ln., #1, Bakersfield, CA 93309. ■

ENTER • ENTER WIN

YOUR VERY OWN
TRC LYNX II
Sports Super Speedway
Pontiac Grand Prix



KITS INCLUDE:
Atronics CS2P FM Radio
Ready Motors
Panasonic P170 SCR Batteries
Novak Electronic Speed Control 410-M1C

To Enter: Send a 3x5 postcard with your Name, Address,
Phone Number and enclose \$5.00 payable to:

EMPIRE HOBBIES

3835 Richmond Ave., Suite #131
Staten Island, NY 10312.

**ALL ENTRIES MUST BE POSTMARKED
BY JULY 31st, 1992**

Void in states wherever prohibited by law.

There will be two winners selected. Winners will be notified by
mail and/or by telephone. Taxes on all prizes are the sole
responsibility of the winners. For a complete list of winners,
send a self addressed, stamped envelope to:

EMPIRE HOBBIES

TIRE-TRUING

(Continued from page 126)

truing arm. With practice, you'll get the hang of it.

The machine is designed to run on battery packs, but you can also run it on a 6V to 9V, 10A power supply. It's easy to take the truer apart to clean it, and you can carry it to the track in a small toolbox. I use a film container to hold adapters, washers and extra wing nuts. The truer cuts 1/12-scale tires as well as 1/10-scale.

My only problem arose when I cut green-dot tires; the dust clogs the ball slide. I solved this by making a 1/2-inch Lexan guard, which I taped in front of the slide. I don't recommend that you try to cut Gommies, because they're too tough, but B-52s are easy to cut.

My tire truer isn't a super-high-tech machine, but it's the next best thing for those of us who are on a budget. And with the money you save, you can buy some new tires. Happy grinding!

(Continued on page 138)



SUNGLASSES \$11.95 plus \$2 S&H

UV • BLUELIGHT • SHATTERPROOF • GOOD GLARE
PROTECTION • CLEAR & LIGHT TINTS FOR SHOP WORK •
FITS OVER MOST PRESCRIPTION EYEWEAR
(available at extra cost) CLIPONS & STRAPONS • INFRARED

Discounts for Club Purchases - 20 pairs or more
Custom Logos for Additional Charge

1 YEAR REPLACEMENT GUARANTEE

VISA/MasterCard • Check • Money Order • COD

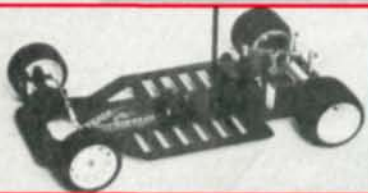
SKYS
PO BOX 1000
DUMFRIES, VA 22026

Orders: 800-227-9318
Info: 703-221-1816

TEAM COBRA SMOKES 'EM AT THE WHIP!!!!!! 1991 LAKE WHIPPOORWILL U.S. OVAL MASTERS

John Broesler, TQ/Wins the A
MAIN MODIFIED, wins the A MAIN
STOCK!
After driving his COBRAS for only
3 weeks!

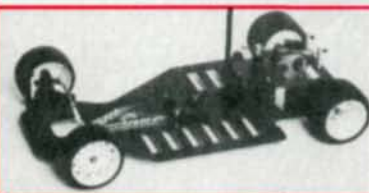
**COBRA LTOOR
TQ/WINNER A MAIN MODIFIED**



"After having owned and raced all other
competitive 1/10th scale cars, I can say
that nothing compares to a Cobra. It was
so much smoother, faster, and easier to
get dialed in, that I was immediately
turning more laps than I had ever turned
before."

John Broesler

**COBRA SS
WINNER A MAIN STOCK**



C & M Team Cobra • P.O. Box 701353 • West Valley City, UT 84170 • (801) 250-9747 • Fax (801) 250-9792
For Catalog & Free Sticker Pack, send \$2.00

**Setting New Standards
In Durability, Style &
High Speed Efficiency!**

**Endorsed by:
Team Hyperdrive
Team Agitator Racing
Team AstroFlight**

1992 LUMINA SS
with Adjustable Rear Spoiler
(Available in 2 weights)
1202LW / 1202RW
ROAR & NORRCA APPROVED



10 Body Styles Available
• ON ROAD • OFF ROAD •
• DRAG • 1/12 SCALE • OVAL •

PROTOform SIMPLY THE BEST

FOR MORE INFORMATION
CALL
(416) 646 7638
Fax (416) 625-5171

In Canada:
4444 Fieldgate Drive, Unit 15,
Mississauga, ON L4W 4T6
In USA:
1733 Maryland Avenue, Unit 3,
Niagara Falls, NY 14305

TIRE-TRUING

(Continued from page 134)

*Here are the addresses of the companies mentioned in this article:

Associated Electrics Inc., 3585 Cadillac Ave., Costa Mesa, CA 92626.

AJ's R/C, 2102 Guiderand Ave., Schenectady, NY 12306.

HPI, 22600-C Lambert St., Ste. 904, El Toro, CA 92630. ■

LETTERS

(Continued from page 9)

JUST ASKING...

1. I recently noticed that Team Losi has introduced new springs that are classified by their length and their rate. How do you determine whether a spring is hard or soft by reading the rate number? And how is

rate determined?

2. Team Losi offers a set of rear pivot supports that are supposed to give you anti-squat and rear toe-in. How do you adjust the anti-squat and the toe-in? How do you adjust the anti-squat and the toe-in to the track conditions by using the pivot supports?

(Continued on page 158)

RADIO ACTIVE

Take charge of the track with JR! JR quality and popular Max style have been combined to create the brand new Max 2 channel radio system for the ultimate in racing control. Features include ABC&W™ receiver with BEC, 2 JR 507 sport servos, BEC switch harness, new multi-tilt racing type short stick system, battery case, interchangeable frequency crystals (27 MHz), servo reverse and computer designed transmitter case. JR's exclusive ergonomic "Bio-Shape" grips fit the human hand for great racing comfort! Off-road or on, JR radios leave the competition in the dust! Great for R/C boat enthusiasts too!

Available at your local hobby dealer.



Max 2

**hobby
Dynamics**

Distributed by Hobby Dynamics Distributors • Phone 1-800-458-0241
P.O. Box 3726 • Champaign, IL 61826-3726 • FAX 1-217-355-0058

JR REMOTE CONTROL
RADIO CONTROL SYSTEMS

SCOPING OUT

by JOHN RIST

Schumacher Traco

WHAT'S BRIGHT yellow, comes from England and is as mean as a snake? If you guessed Schumacher's* Traco racing-style electronic speed controller (ESC), you were right on the mark.

Although its eight-page instruction sheet doesn't list everything that a prospective buyer would want to know, i.e., current-handling capabilities, information about "on" resistance, etc., it does list some features, and two of them really caught my eye. The Traco is a high-frequency, motor-control ESC, and it's programmable, too. (This explains the presence of a socket that's labeled "program" and the 5-inch-long cable with a Futaba J connector on one end and a push-button on the other.)

With my curiosity piqued, I plunged headlong into my investigation of this forward-only-with-brakes unit with these features:

- a microcomputer;
- programmable settings for neutral, max forward, max reverse, full-power point and eight acceleration and braking rates;
- six FETs for forward; two for brakes;
- a built-in LED that indicates throttle-

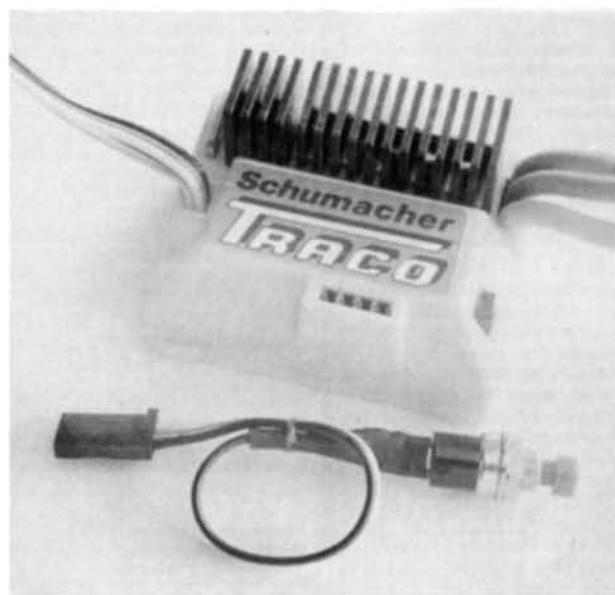
range settings;

- an instruction sheet, a programming-switch cable and a complete set of heat sinks.

Opening the bright-yellow case was a challenge. The bottom of it is held in place by four plastic, fishhook-style tabs. Although such fasteners often break off, in this instance, I slipped an X-Axto knife blade under each tab and released it without damaging the case.

Inside is a massive 40-pin integrated circuit that contains all the unit's memory. Its main intelligence program processes transmitter input and then makes all the calculations and decisions that control the FETs. To make a long story short, this controller has a full-blown computer hidden inside its bright-yellow case!

The Traco's inner workings appear to be well-made. There are two printed-circuit boards: one contains the computer chip; the other, all the FETs.



AT THE LAB

I put the Traco back in its case and headed for the "Scoping Out" lab. Having a microcomputer in your controller is impressive, but it's low "on" resistance that wins races.

I found it difficult to identify the Traco's leads. It's a three-wire controller, and I knew that its pink wire should

"SCOPING OUT" LAB AND TESTS

• THE LAB consists of:

- an oscilloscope
- a digital voltmeter
- a variable-load resistor bank
- a 6V 30A electricity supply
- a Pit Stop Radio servo/speed controller tester.

The oscilloscope is used to monitor the controller's output and to guarantee that it's fully on.

The digital voltmeter takes all the voltage-drop readings and verifies the reading on the current meter.

The resistor load bank consists of 40, 12-ohm, 5W power resistors that can be switched on and off one at a time to vary the load between 6 amps and 20 amps, but the

standard 12 amps are usually used.

In series with the resistors is a 25A Simpson current meter and a 1-percent 0.01-ohm resistor. By measuring the voltage drop across this resistor, the current meter's reading can be double-checked. Of course, the lab power supply provides the test current.

• **VOLTAGE-DROP TESTS.** These are the first tests. It's virtually impossible to read an ESC's resistance directly, so I measure the voltage drop across it with the resistor bank set up for 12 amps of current. I then calculate the controller's "on" resistance by dividing the measured voltage drop by 12 amps. I take the voltage reading twice: along the full length of the battery and motor wires (including con-

nectors) and 2 inches along them. The first reading helps me to determine an ESC's "on" resistance as it comes from the factory, and the second gives a standard reading with which I compare ESCs.

• **LET-IT-COOK TEST.** I adjust the resistor bank to pass 20 amps of current, then I jam the throttle wide open and let the ESC pump the 20 amps.

• **DEAD-SHORT TEST.** With this test, I check whether the controller can survive the heavy current caused by a jammed gear or a fried motor. No one likes to have this kind of trouble and discover that his ESC has been destroyed, too.

be used to connect it to the battery. (Another pink, unattached wire is also included to connect the battery to the motor.) Its two blue leads, however, aren't labeled. Using the line drawing shown in the instructions, I managed to work out how they should be connected. I hooked up the controller, held my breath and turned on the power. There wasn't any smoke, so I knew that I had connected it correctly. (I wish that foreign controller manufacturers would use red wires for battery/motor positive, black for battery negative and blue for motor negative.)

The Traco doesn't have any adjustment potentiometers for neutral or full speed, so I programmed the unit using the single programming-switch cable and the manual's step-by-step instructions.

It's very easy to match your transmitter to the Traco. First, connect it to the throttle channel on your receiver. With the transmitter and the controller turned off, plug the programming-switch cable into the socket labeled "Prog." Turn on the transmitter—then the controller—advance the throttle to "full forward," and press the program button once. Advance the throttle to "full brakes," and press the program button again. Advance the throttle to the full-power point (usually about the 80-percent point), and press the program button again. Release the trigger and unplug the programming-switch cable. The Traco is now perfectly matched to your transmitter and awaits your every command.

RESISTANCE TEST

I always check the resistance first, because it's an ESC's most important quality. With 12 amps of current flowing, the voltage drop along the length of the wires was 0.09 volt—an "on" resistance of 0.0075 ohm. Two inches along the wire, it was 0.07 volt—a resistance of 0.0058 ohm.

These low "on" resistance values imply that the Traco will hold its own on the track. The two resistance measurements are close because the Traco has fairly short leads (and no motor or battery connectors) and is equipped with Parma 13-gauge, low-resistance wire.

LET-IT-COOK TEST

After 15 minutes, the Traco was quite warm, but I could touch the heat sink without being burned. Based on the controller's resistance, this amount of heat can be considered normal.

DEAD-SHORT TEST

With a dead-short across the motor leads, I jammed the pedal to the metal and watched

the current jump to 40 amps—the limit of my lab supply. I usually try to run the test for 1 minute but, after 40 seconds, the controller became so hot that I could smell it burning, and the heat sink was hot enough to burn my finger. I turned off the controller and let it cool. When I turned it back on, there wasn't any throttle response. (The Traco had been set at full throttle the entire time.) The controller had become so hot that the solder on one of the FET leads had melted, and one of the FETs had shorted. The plastic case had also been damaged. After I had replaced the bad FET and cleared the solder bridge, the Traco returned to its normal, power-pumping self.

This controller needs an automatic thermal-shutdown device. Just remember this, and heed my usual warning: if your car won't run, turn off the power and look for the cause of the trouble before you destroy an expensive piece of equipment.

ON THE ROAD AGAIN...

I was excited about testing this high-frequency, microcomputer-controlled ESC at the track. I referred to the instructions for installation do's or don'ts, but the only words of wisdom I found were those that suggested positioning the controller to allow access to the programming socket and that warned against letting the heat sink touch any metal parts. Neither the instructions nor the drawing referred to the use of filter capacitors on the motor, but I installed three of them, anyway. (With high-frequency controllers, you don't need large capacitors, i.e., 4.7 microfarad and greater, so I installed three 0.1 microfarad capacitors.)

I installed the Traco in my Kyosho Sideways. It's also equipped with a Speedworks Boss stock motor and a 6-cell SCR battery pack. A Futaba Magnum Jr. radio provides the guidance.

From the very first squeeze of the trigger, the Traco displayed all the characteristics of a hot, high-frequency controller. The throttle response was very smooth—especially at low speeds—and acceleration was wheel-spinning. Awesome! The run times were very good, and the brakes were strong.

SCHUMACHER TRACO

DIMENSIONS:

Height	0.86 inch
Width	1.5 inches
Length	2.1 inches
Weight with wires	3.1 ounces

TUNING:

Access to Controls	Excellent
Ease of Adjustment	Fair

PRICE:

Sug. Price	\$249.95
Warranty	30 days

ELECTRICAL:

(Manufacturer's Specs)

Max Voltage	Not listed
Min Voltage	Not listed
Max Current	Not listed
Continuous Current	Not listed
Resistance	Not listed

TEST PARAMETERS:

Voltage	6 volts
Current	12 amps
Voltage drop along length of wire	0.09 volt
Voltage drop 2 inches along wire	0.07 volt
Resistance to end of wires*	0.0075 ohm
Resistance 2 inches along wires	0.0058 ohm
BEC voltage, 6-cell pack	5 volts

*Calculated resistance = voltage drop/current

COMMENTS:

Microcomputers can be found in everything from coffee pots to communication satellites, and now they're showing up in speed controllers. The computer chip under the Traco's bright-yellow cover enables you to match the unit to any radio system accurately with the push of a button. It also provides eight different acceleration and brake responses. The Traco's "on" resistance is low enough to make it a contender in the racing world. My dead-short test damaged it, but there was little or no heat during the road tests. This controller has high-frequency motor control that provides extremely smooth throttle response. With its programmable acceleration and brakes, the Traco should be very helpful on slippery, tight roadcourses.

I ran the car to the far end of a parking lot—so far that I could hardly see it—and, even at this distance, there wasn't any radio interference. I checked the heat sinks after each of the car's four runs, and they were barely above room temperature. If you give the Traco a little cooling air, it will keep its cool.

During one of the runs, I played with the acceleration rates, which are easy to program. Just turn on the transmitter and the car and then plug in the programming cable. (Note that when you program the ESC to the transmitter, you plug the cable in *before* turning on the power.) Slowly advance the throttle and count the number of times the Traco's LED flashes. Its response is quite positive and ranges from zero (instant acceleration) to seven (0.7-second delay). The difference between these settings is dramatic. With a setting of "zero," the Traco provides wheel-spinning, instant acceleration, but when it's set at "seven," the acceleration feels "mushy" when you jam the trigger. On a slippery roadcourse, you should be able to find a setting that will control wheel spin and keep you out of trouble in tight curves.

CONCLUSION

Owing to its low "on" resistance, the Traco is a serious racing controller. Its programmable features and high-frequency motor control make it suitable for use on tight roadcourses. Although there were problems during the dead-short test, the controller remained cool during the test runs.

The instructions should be improved. They don't provide clear directions on how to install the controller and, although they mention a 30-day warranty, they don't provide an address in the U.S. for repairs. (See address at the end of the article.)

Although the negative battery and motor leads are both blue, if you carefully examine the illustration shown in the instructions, you'll be able to determine which lead goes where. (Be careful! Reversing the battery and motor leads will destroy the controller.)

If you're looking for the competitive edge that a programmable speed controller will provide, the mean, yellow Traco is the ESC for you.

**Here's the address of the company featured in this article:*

Schumacher Inc., 6302 Benjamin Rd. #404, Tampa, FL 33634.

COMPETITION BATTERIES

ALL OUR BATTERIES & NUMBERS ARE GUARANTEED!

SANYO 1400 SCR

20 AMP DISCHARGE	
UP TO 275	19.75
276+	25.00
285+	29.00
290+	37.00
300+	54.00
301+	63.00

HI VOLTAGE OVAL AVAILABLE

"NEW" SANYO 1700 SCR

20 AMP DISCHARGE	
340+	36.00
350+	45.00
360+	47.00
370 & OVER	CALL

HI VOLTAGE OVAL AVAILABLE

PANASONIC P-170's

20 AMP DISCHARGE	
340-345	36.00
346-355	43.00
356-365	48.00
366-375	57.00
376+	CALL

ALL SANYO'S CYCLED 4X & PANASONIC'S 8X BEFORE MATCHING

ALL "WORLD CLASS" CELLS COME WITH 1 YR. FREE REMATCHING!

WE WILL MATCH "YOUR" BATTERIES - SOLDER FREE - \$1.00 EACH CELL
WE WILL BE GLAD TO ANSWER ANY QUESTIONS TO HELP YOU GET THE RIGHT PRODUCT!

PERFORMANCE GUARANTEED AROUND THE WORLD!

WORLD CLASS

HOURS: MON.-THURS. 9-7
E.D.T. FRI. 9-4 & SAT. 9-1

MC - VISA

8021 JAMES COURT
NIWOT, COLORADO 80503

303-652-3038

C.O.D. \$4.50

DEALER INQUIRIES WANTED! SHIPPING \$4.50

TOP MODELS U.K. !!! ATTENTION !!!

U.S. manufacturers of 1/10-scale off-road R/C car parts and kits.

T.O.P. Models is expanding its distribution lines to the U.K. market and is anxious to obtain more agencies from U.S. manufacturers.

At present, T.O.P. distributes:

- Team Pit Stop
- Team Cobra
- PTI/Hyperdrive
- Litespeed
- Eagle
- Aero Car Technology
- HPI
- Race Prep
- Bold Creations
- Ironman
- Team Smooth

Interested companies please send all catalogues and price lists to the address below or telephone or fax 011-44-352-757788.



F.A.O. Brian Stacey.
T.O.P. MODELS
P.O. Box 888
MOLD
CLWYD
North Wales
CH7 4XB
United Kingdom



STEALTH BATTERIES

Panasonic P-170 SCR

Type I to 334	\$ 7.00 per cell
Type II 335+	\$10.00 per cell
Type III 350+	\$13.00 per cell

Sanyo 1400 SCR

Type I to 279	\$ 5.00 per cell
Type II 280+	\$ 7.00 per cell
Type III 290+	\$ 9.00 per cell

Sanyo 1700 SCR

Call For Prices
Above Prices Include
Regular Shipping and Handling

10 Amp Constant Power Supply \$69.95

Pyramid Gold Series Power Supply
Call for Price

★ **1991 CHAMPIONSHIPS** ★
Short Track National Champs -- Modified T.Q.
Calif. Dirt Oval State Champs -- Stock and Modified
Region 12 Dirt Oval Champs -- Stock
Region 12 On-Road Champs -- Stock

Stealth Electronics

5534 Las Virgenes Rd. #115 Calabasas, CA 91302
(818) 880-6845
9 - 6 Mon. - Fri.
Pacific Time

MEXICO

**la tienda más grande
y completa de radio control
en México**



Importación directa de:

TEKIN · TEAM ASSOCIATED · BOLINK · KYOSHO · TEAM LOSI · NOVAK · PARMA · FUTABA

HOBBY CENTRO

Av. Insurgentes Sur 2374, México D.F. 01000, Centro Comercial "El Relox"
Teléfonos: 548 38 58 y 548 38 54 FAX: 548 76 51
Precios de mayoreo a tiendas establecidas

SUBSCRIBE

HOBBY KING

Brooklyn's Price Warriors!

* TAMIYA *	* NOVAK *	* FUTABA *
LUNAROSE.....\$ 96.50	410 H-5.....\$ 64.99	2MCR.....\$ 41.99
BLACKFOOT.....99.95	410-MIC.....89.75	2PBR.....53.99
MIDNIGHT PUMPKIN.....113.50	410-MXC.....102.99	2PBKA.....73.99
MONSTER BEETLE.....139.50	610-RV.....88.95	2PBKA W/REC.....114.50
KING CAB.....167.95	828RV.....99.75	
CLODBUSTER.....238.50	* CHARRERS *	* CARS & TRUCKS *
* TRISTY MOTORS *	900 AC/DC.....\$ 24.50	PANDA OFF-ROADER.....\$ 54.00
NUCLEAR ASSAULT.....\$ 43.50	PROTECH 701.....42.50	STADIUM TRUCK.....79.00
BERENHOUT.....43.50	PROTECH 702.....34.50	STOCKER OP10 GAS.....189.99
JOEL JOHNSON.....43.50	PROTECH 706.....65.50	JRX PRO.....157.99
EQUALIZER.....14.75	PROTECH 707.....52.50	JRX TRUCK.....159.99
* BATTERY PACER *		NITRO CRUSHER.....339.99
7.2 VOLT, 6 CELL.....\$ 14.75		PIRATE.....319.99
1700 mAh.....27.50		REINACHER W/ECOLIO.....359.99
		SERPENT 6010/2 SP.....499.99



Visit our store

PANDA SPECIAL COMBO DEAL!

COMBO INCLUDES:

- AC/DC Auto Cut-off Charger
- PANDA Off-roader kit
- 2-Channel Stick Radio
- 7.2 V Rechargeable Battery

ONLY \$176.99

FOR STOCKER, ADD \$14.00

TURBO BURNS

"A REAL WINNER!"

ONLY \$448.99

PANDA TESTAROSSA

OUTRAGEOUS!

ONLY \$214.99

90% ASSEMBLED GAS POWERED w/ENGINE

WILL BE RARE!

ONLY \$199.99

IN THE DARKEST HOUR... ONE CAR STANDS ALONE

THE BATMOBILE

BATMOBILE RTR

FULLY ASSEMBLED

WITH RADIO!

2720 AVENUE U
Brooklyn, N.Y. 11229

1-800-34-HOBBY
For Orders Only: 1-800-344-6229
For information & N.Y.C.: (718) 648-5399

ORDERING INFORMATION: Shipping & handling add \$4.95. Minimum add \$4.95 order for COD orders. Prices are subject to change without notice. Missing parts and accessories are available for purchase. Shipping and handling charges not refundable on returns with our label authorization. We reserve all rights.

LETTERS

(Continued from page 138)

3. How does Team Losi's Hydra-Drive take the place of a torque controller? I thought that the torque controller's action limited the amount of current going through the speed controller to the motor.
 4. What are the degree ranges of caster that I can obtain in my Losi JR-X2?
 5. What is bump-steer?
 6. If wheel deflection caused by bumps varies camber, how are you supposed to set the camber according to the track conditions?
- I appreciate your support; your magazine has been a great help to me!

MORRIS DEPPI
Windsor, Ontario

1. Team Losi's new springs are now rated by compression numbers that are more precise than the old "extra soft" and "soft" ratings. The higher the compression rate, the stiffer the spring. For example: a red rear spring has a 2.6 compression rate, as opposed to a pink spring's 2.3 compression rate. The pink spring's lower compression rate means it's softer than the red spring. The orange spring (2.9 rate) is stiffer than both the red and the pink springs.

2. Losi offers four pivot supports for the JRX cars that use the H-arm rear suspension. Each support has a different number of degrees of toe-in and anti-squat. For example: the no. 1 support has 3 degrees of toe-in and 3 degrees of anti-squat, while the no. 2 support has 3 degrees of toe-in, but 1 1/2 degrees of anti-squat. You can adjust the car's handling by changing the rear pivot supports.

3. The Hydra-Drive system is designed to allow the new Losi Friction Slipper to be set more loosely but retain throttle response. Designed to work like a torque converter on a full-size car, the Hydra-Drive allows the slipper to be set very loose to prevent wheel spin, but when a certain rpm is reached, the Hydra-Drive locks up the slipper clutch. The Hydra-Drive has nothing to do with the electronic torque-limiting feature that most speed controllers have. Electronic torque control limits the power going to the motor, while Hydra-Drive limits the power coming from the motor.

4. The stock JRX-Pro and JRX-Pro SE have 30 degrees of caster molded into the chassis, while the original JR-X2 had 20 degrees of caster. If you really feel that you have to deviate from the stock set-

(Continued on page 175)

Advanced	Branson Ultrasonic	Dubro	Imex	MIP	Progressive Tech.	Robinson	Tekin
Airtronics	Bud's	Eagle	Ironman	MRC (Tamiya)	Pro Star	Saiko	Thorpe
A&L	Cam	East Coast	Jaco	MRP	Puretech	Sassy Chassis	TNT
A-Main Racing	Cheetah	Edge	Jammin'	Novak	Pyramid	Schumacher	TQ
Andy's	Class	Elite Speed	JG	Ozone	Racer's Choice	Shinwa	Track Master
Associated	C&M	Endurance	Kimbrough	Pactra	Ram	S&K Racing	Traxxas
Astroflight	Cobra	ESP	KO Propo	Paragon	Race Prep	Speedworks	TRC
Autograhics	Comp. Electronics	Fast Lane	LAVco	Parma	Racer's Edge	Stage III	Trinity
Bad Dog	Composite Craft	Fine Design	Lightning Prod.	Peak-it	RCPS	T&A	Twinn-K
Bel Ray	CRP	Five Star	Lightning Rod	Perfect Match	R&D	T.A. Emerald	Twister
Big Boy Toys	Custom Chrome	GPM	Litespeed	Premier Designs	Revtech	Team Losi	Ultra 5
Bold Creations	Custom Works	Hole Shot	Lunsford	Protoform	Royal	Team Smooth	Unger
Bolink	Dan's	HPI	MaxCell	PRP, Gator	RPM	Tecnacraft	Victor
Bondhus/Wiha	Dahm's	Hyperdrive	McAllister	Proline		Teddy's Racing	W.S. Deans
B&R	Delta						

NEW LINES: Steven's & Son, New Wave, Voodoo, Davis Motor Sports, Big Jim.

50 NORTH HARRISON AVE., UNIT #14, CONGERS, NY 10920

LETTERS

(Continued from page 158)

tings, you can use any of Associated's caster blocks (which range from 5 degrees to 25 degrees, in 5-degree increments) or RPM's bulkhead, which adds 10 degrees of caster to what's molded into the chassis.

5. "Bump-steer" refers to a change in steering angle as the suspension is compressed.

6. When you set camber, set it with the battery and the motor in the car, and do it after you've set the ride height. Even though there's some camber variation during wheel deflection, the car will (we hope!) remain at these settings while it travels down the straights and over the jumps. AS

SLIPPER OR STOCK?

I've been into R/C cars for five years, and I've been subscribing to your magazine just as long; it has helped me a lot. One question has been on my mind: I own a JRX-Pro, and I understand how a diff works, but I'm not sure how the new Losi slipper clutch works with the differential.

MATTHEW MOCARSKY

Woodbridge, NJ

The Team Losi Friction Slipper is designed to allow slippage other than from the diff when the car accelerates. In the JRX-Pro, the only way to control a hot motor or accelerate on a slippery surface without spinning the tires was to loosen the diff so that it would slip slightly when the car accelerated. Loosening the diff,

however, can compromise handling or melt the diff. Losi decided to separate the slipping action from the diff action by creating the Friction Slipper. With this, you set the diff so that there's no slip (but its action is still free) and then adjust the slipper clutch to the desired amount of slip. AS

TIRESOME TENSIONER

I have a Schumacher Cat that seems to have problems with its bulkhead. The designers of the Cat decided to use a "tensioner," or rubber band, to keep the front end together. This proves to be useless on the racetrack, as I have to replace it after each race. Has Schumacher come up with a better idea or an after-market

(Continued on page 177)

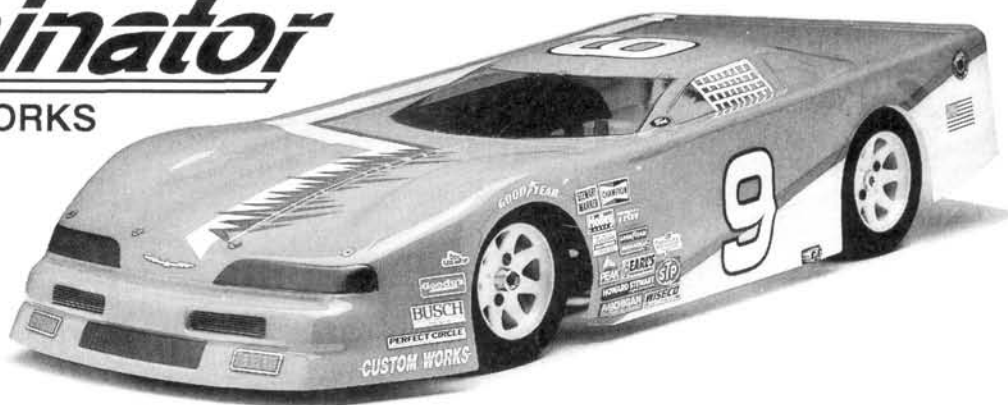
WE ARE WRITING THE BOOK ON OVAL RACING PERFORMANCE. CHAPTER ONE

Dominator

BY CUSTOM WORKS

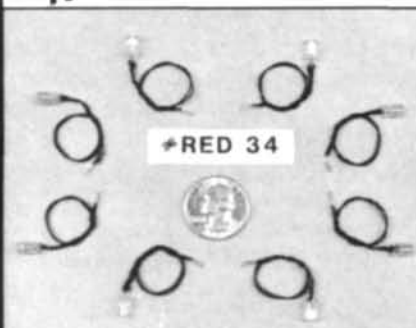
10 TIME
NATIONAL
CHAMPION

CUSTOM WORKS
3720 Easton Dr., #6
Bakersfield, CA 93309
Phone (805) 323-0471
FAX (805) 323-0473



NEW CLEARANCE LIGHTS

NEW CAB MARKER LIGHTS



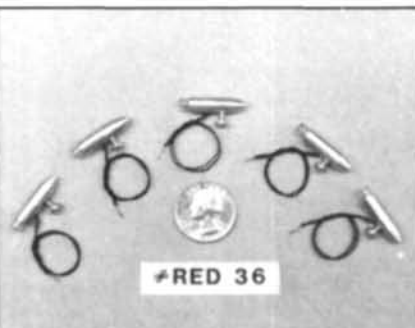
#RED 34 \$11.95

#RED 34 This 8 light set provides for all 4 sides of a truck, tractor or trailer. The 3/16 inch diameter, round, amber lenses are a near perfect scale replica of commonly used clearance, marker and running board lights. Use a 9 volt alkaline battery or your 6 cell car pack.

#RED 36 These assembled, scale lights are 1 inch long, have amber lenses and are ready for quick installation. They are aluminum, rugged and AMERICAN MADE. The 5 light set uses a 9 volt alkaline battery or your 6 cell car pack.

• See Your Dealer •
• Send Stamped Env. For RAM info •
If unavailable locally send check, money order or full credit card info for the cost of the item plus \$4.00 (\$5.00 foreign) for immediate shipment. Include full address for U.P.S. Sorry no C.O.D.

Ram 229 E. Rollins Rd. Round Lake Beach, IL 60073



#RED 36 \$19.95

LETTERS

(Continued from page 175)

replacement that would eliminate this problem? If not, do you have any suggestions?

ED GOVEDNIK
San Jose, CA

Many Schumacher cars have a unique "crash-back" front suspension that, in the event of a severe crash, allows the entire front suspension to pivot backward and then return to its original position. Several rubber bands are used to keep the front end in place during normal running. On Schumacher's Pro Cat, O-rings were substituted for the rubber bands, and they work flawlessly. I suggest that you either order them from Schumacher USA, or go down to your local hardware store and see if you can find O-rings of the correct size. AS

QUESTIONS! QUESTIONS!

Would an RC10 Champ be able to race against JRX-Pros and RC10 team cars and be very competitive? Do universal swing shafts work much better than dogbones? What's a wet magnet? Keep up the great work.

JIM NICHOLS
DeWitt, MI

Yes, the RC10 Champ would be able to race against JRX-Pros and Team Cars; just make sure that its tranny is well-maintained and that it operates smoothly.

Unlike dogbones, universal swing shafts don't fall out of the drive cups, and yes, they're slightly more efficient.

A "wet magnet" isn't actually wet; the term refers to the way the magnet is made. All the charged particles are aligned when wet, and they're then "pressed together." Wet magnets are more durable and resist

heat better than dry magnets, and this makes them perfect for R/C car motors. AS

DISSED

I've written several letters with several questions and you never printed them. What's wrong with you guys? I've been driving an Ultima Pro XL for some time, and I want to get a new car. How is the Kyosho Lazer ZX? Can it handle a 9T to 15T modified? And can the MRC PK 151 ESC handle a motor that hot? Well, my batteries are charged, and I'm going to thrash some parking lot. Your mag is the best!

KELLY BROEREN
Green Bay, WI

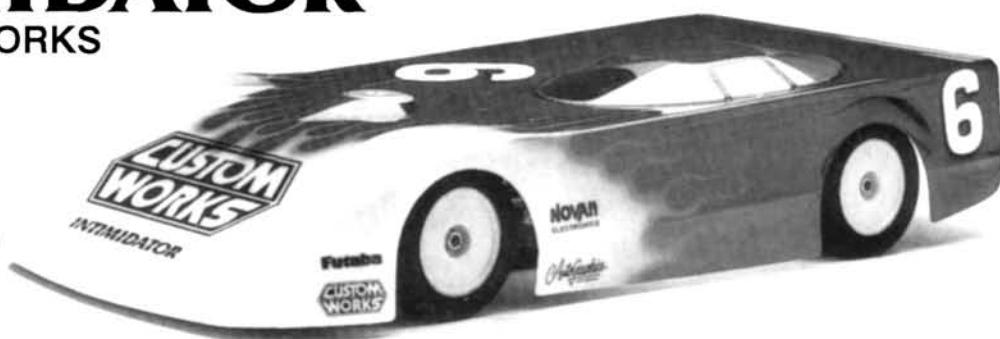
Kelly, sorry we waited until your fourth letter; we were just stringing you along, but we'll try to prevent it from happening

(Continued on page 178)

WE ARE WRITING THE BOOK ON OVAL RACING PERFORMANCE. CHAPTER TWO

INTIMIDATOR BY CUSTOM WORKS

5 TIME
NATIONAL CHAMPION



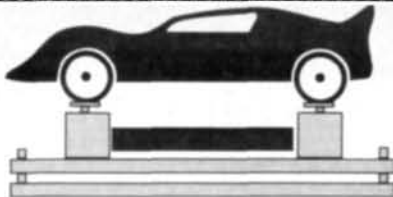
CUSTOM WORKS
3720 Easton Dr., #6
Bakersfield, CA 93309
Phone (805) 323-0471
FAX (805) 323-0473

QUICK R/C

Weigh Station for 1/10- and 1/12-Scale Cars & Trucks

- For on- & off-road racers
- Includes base, 4-way leveling, 4 scales and instructions
- Quickly and accurately gives weight of each wheel.

Tune your suspension with the weigh station to suit your driving style, then maintain it with the weigh station to keep it that way. Proper suspension tuning can make a car last longer and put you in the winners' circle. Dealer inquiries invited.



Complete Weigh Station \$69.95
(UPS free shipping)
4 Parts Trays \$4.00 plus \$2.95 S&H

Send check or money order
(CHECKS ALLOW 10 DAYS TO CLEAR)

QUICK R/C
RTE 1, BOX 536
ALBEARLE, NC
28001
(704) 982-2353

LETTERS

(Continued from page 177)

again. The Lazer ZX is a good car, but you might want to consider the new version—the ZX-R. It comes with ball diffs and many other hop-ups that make it more competitive. As for the 9- to 15-turn motors, it will handle them well, but I'd consider anything less than a 10-turn motor a little too much. I don't recommend that you use the PK 151 with hot motors, and it's rather large, so it might be difficult to fit on the chassis. Now, go burn some rubber. JH

I USED TO BE A CONTENDER

When I started racing R/C cars, I had a JR-XT—the best-known truck at the time. Then, something happened; and what was great to everyone else was my misfortune. I thought that the RC10T would be great. I even planned to buy one, until I discovered how much a new one costs. I knew that everyone would want one, but I was hoping that the high price would make people hold out for a while. I was wrong. I used to be a great contender, but now I'm no match for anyone. I have to rely on the inexperience of others just to end up in sixth! Since my budget could gag a buzzard, being 14 won't land me a job, and where I live, nobody has a lawn to mow (apartment life is really tough), I'm asking you for help. How can I make a JR-XT as good as an RC10T on \$15? I'd really appreciate your help.

MARC "WOODCHUCK"
OBENSHAIN
San Antonio, TX

Woodchuck; the Chuckmeister; the Woodman; Woody: I know how it feels to be outclassed at a race. With all the innovations constantly flooding our market, it's hard to keep up, but that's what makes the hobby so interesting: there's always a new way to increase performance. As far as modifying your JR-XT goes, I have good news and bad news. The good news is that Team Losi has released a kit to convert your truck into the new LX-T. The bad news is that it doesn't cost \$15. Because there are quite a few new parts in the kit, it costs \$139.95. If you can scrape up another 15 bucks, try Losi's slipper clutch—at least, it's a start. JH

(Continued on page 186)

WORLD OF TRAINS DISCOVER QUEENS DISCOUNT R.C. CENTER

MRC BULL HEAD	183.99	MRC MONSTER BEATLE	139.99	RC 10 (7001) RACING TRUCK	168.95
MRC BLACK FOOT	97.50	MRC MUDBLASTER	99.99	RC10 (6010) CAR	110.95
MRC SUPER G	64.95	MRC MIDNIGHT PUMPKIN	112.99	RC 10 (6035) TEAM CAR	154.99
MRC LUNCH BOX	91.99	MRC BOOMERANG	119.99	TEAM LOS, JRX PRO SE	157.98
MRC CLOD BUSTER	234.95	MRC NISSAN 300 ZX	122.99	TEAM LOS, JUNIOR TRUCK	115.99
MRC KING CAB	164.95	MRC TOP GUN RADIO	49.99	7.2 RACING PACK	12.99

WE CARRY ENTIRE LINE OF KYOSHO
GAS AND ELECTRIC CARS & BOATS

105-18 METROPOLITAN AVENUE • FOREST HILLS, N.Y. 11375

718-520-9700
ORDER NOW!

ORDERING INFORMATION: Add 5% for shipping on all orders. Minimum shipping is \$5.95. Make checks payable to: World of Trains. New York residents add applicable sales tax. Allow 3 weeks for personal checks to clear. Prices subject to change. All goods guaranteed and warranted by manufacturers only.

New England Hobbies

RC Car Specialist
1-800-52-HOBBY

Radios

Futaba 2 NCS	37.99
Hightech 2-channel radio (stick)	49.99
JR Max 2 stick (with BEC)	36.99
JR R-756 PCM 3-channel (wheel)	229.99
JR Alpina PCM (wheel)	74.99

Car Kits

Assoc. RC10T #7001	169.99
Assoc. RC10 Graphite "team car"	171.99
Assoc. RC10L Graphite	124.99
Losi LXT w/HyDra Drive	180.99
Losi Junior 2 Kit	102.99
Losi Pro SE	162.99
Traxxas TRX1	172.99
Traxxas Hawk	99.99

Combos

(with 15 Min. charger + 1300 mAH Batt. Pack)	
Traxxas Hawk RTR	189.99
Traxxas Radicator RTR	194.99
Tamiya Hornet	139.99
Trinity #5889 1300 SCR	3 for 45.99
Novak 410-M5 Speed Control	69.99

S&H \$4.95 COD add \$4.95

Prices subject to change without notice.

Hours 1-9 M-F 10-6 Sat

THE INSIDE LINE

"THE SOURCE FOR HIGH-SPEC R/C RACING PARTS"
Introducing the aluminum split front end that outperforms all others.
SATISFACTION GUARANTEED! All parts assembled from high grade aircraft aluminum.

LIGHTWEIGHT & STRONG
Quick change half axles allow easy & precise CAMBER/CASTER adjustment for left & right sides.

FEATURES INCLUDE:
Quick spring adjustment & removal.
NO E-CLIP USED, stock steering parts, NO TURNBUCKLES TO BREAK!

ALUMINUM SUPER LIGHT
HUBS \$29.99 A PAIR
Other parts & supplies available
Send \$2.00 & SASE for catalog
CUSTOM MACHINE WORK
UPON REQUEST

#2201 10L #2202S LYNK R.S.S.
#2201S 10L S.S. #2203 12L
#2202 LYNK WPRO 10

COMPLETE KIT INCLUDES:
All parts plus 4 half axles - 0, 1, 2, 3, degree
FOR \$65.95

COD available, or send check, money order (plus \$5.00 shipping) to:

THE INSIDE LINE
12859 Rt. 108 • Highland, MD 20777 • (301) 854-2701
• DEALER INQUIRIES INVITED •

Surplus R/C Parts

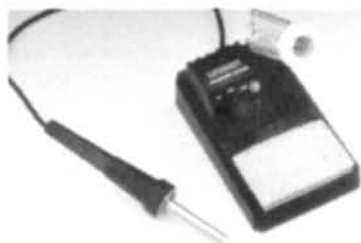
800 Stock Motors
(Race Prep, Green Endbell)..... 6.00 ea.
600 N1200 SCR Batteries 2.00 ea.
225 KR-1700 SCE Batteries 2.50 ea.

Prices good while supply lasts.
Minimum order, \$20.

Send certified check or money order.

Pearce Hobbies
5715 W. Diamond K. St.
Tucson, AZ 85713-4470
(602) 883-1071

WHAT'S NEW

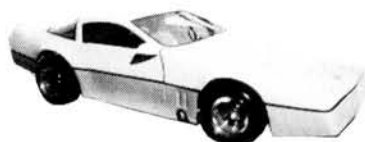


UNGAR Econo Station

Ungar's new UTC SSH Solder Station offers budget-conscious racers an all-in-one, professional soldering station at a very reasonable price. It has two wattage settings (21 and 35 watts) in its built-in base, and it comes with a synthetic, contamination-free sponge; a general-purpose soldering tip; and a special chisel tip that's perfect for heavy-duty jobs, e.g., soldering batteries, motor leads and brushes.

Price: \$59.95

For more information, contact Horizon Hobby Distributors, 3102 Clark Rd., P.O. Box 6029, Champaign, IL 61821.



NEW ERA MODELS 1/4-Scale Sports Car

New Era's Corvette, IROC-Z and Firebird Trans-Am models have hand-laminated fiberglass bodies; heli-arc-welded chrome/moly tubular frames and rear axles; rear disk brakes; Super-Duty shocks; independent front suspensions; and five-link rear suspensions. You can adjust the caster, camber, toe-in and gear ratios of these 1/4-scale sports cars, and each comes with a 33cc engine, a centrifugal clutch and authentic Racecraft rubber tires.

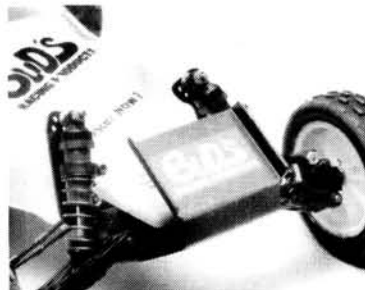
For more information, contact New Era Models Inc., P.O. Box 7378, Nashua, NH 03060.



FUTABA FP-MC210CB ESC

Futaba's MC210CB ESC with reverse has a 30A fuse to protect it from overload and shorts caused by reverse-polarity hookup. The reverse speed is regulated (about 50 percent of full throttle), and the unit has a built-in 1-second delay (to reduce motor-brush arcing) and a built-in LED check circuit with neutral and high-speed adjusters. Perfect for cars, boats and tanks, the MC210CB provides the receiver with regulated power (4.8 volts), which eliminates the need for extra batteries.

For more information, contact Futaba Corp. of America, 4 Studebaker, Irvine, CA 92718.



BUD'S RACING PRODUCTS RC10 Front Bumper Wing

This unique unit is a front bumper and a wing in one! Designed for use with graphite or aluminum RC10 chassis, it will compensate for chassis kick-up during high-speed turns.

Part no. 5228

Price: \$4.50

For more information, contact Bud's Racing Products, 1575 Lowell St., Dept. RCCA, Elyria, OH 44035.



TRINITY SCRC Pushed Cells

Trinity now offers Sanyo's new SCR-type, 1700mAh, pushed "Super Cells"—the SCRCs—in a variety of configurations. Their high-voltage output and extended capacity make them the perfect alternative to SCE cells for modified and stock racing. Because they're SCR-type cells, they won't break down when they're charged repeatedly.

Part nos. 5604 (4-cell pack); 5606 (6-cell pack); 5607 (7-cell pack).

Prices: \$54.99; \$74.99; \$85.99.



The Tool

Now you can have wrenches of the two most popular sizes in one tool. Trinity's purple-anodized Allen wrench—The Tool—has an .050mm tip (for pinion gears) in one end and a 3mm tip (for motor screws) in the other. You'll never again pick up the wrong wrench during a quick pit stop. The Tool's handle provides you with excellent leverage, and its tips are precision-machined of ultra-hard drill blank, so they're extremely durable. (The Tool also accepts Trinity tips of different sizes.)

Part no. RC 7800

Price: \$19.99

For more information, contact Trinity Products Inc., 1901 E. Linden Ave. #8, Linden, NJ 07036.



KYOSHO Thunderbird

Kyosho's new 1/10-scale 2WD Thunderbird stock car comes with a .12ci O.S. CZ-R engine installed and a body complete with colorful sponsor decals, stripes, hood pins and windshield clips. The wheels come with trued, green-compound foam racing slicks mounted on them. A flip-top fuel cell, a recoil starter, oil-filled shocks and an aluminum chassis are also included.

Part no. KYOC0519

Price: \$399.95

For more information, contact Great Planes Model Distributors, P.O. Box 9021, Champaign, IL 61826.



DURATRAX CZ-R Slide-Valve Carb Kit

The DuraTrax high-performance, after-market carburetor replaces the stock carb on O.S. CZ-R engines. It's perfect for use with the Kyosho Rampage, Outlaw Rampage, Corvette ZR-1 and Thunderbird Stocker. It increases fuel efficiency, and it improves throttle response and low-end performance. It comes with a throttle-linkage conversion kit and instructions, and no modifications are required.

Part no. DTXG2000

Price: \$59.95

For more information, contact Great Planes Model Distributors, P.O. Box 9021, Champaign, IL 61826.



DAHM'S RACING BODIES Terror

Dahm's new Lexan racing body—the Terror—for the Kyosho Triumph the JRX-Pro and the JRX-Pro SE is low, narrow and extremely aerodynamic. It has molded-in trim lines (for the Triumph and JRX-Pro) and vents that keep the batteries and the speed controller cool. The Terror is shown on the Triumph with Dahm's Terror Power Pan Lexan underbody. (The Terror body comes with a super-fin wing.)

Part nos. D107 (Terror body); D107C (body and underbody).

Prices: \$17.98; \$26.98.

For more information, contact Dahm's Racing Bodies, P.O. Box 360, Cotati, CA 94931.

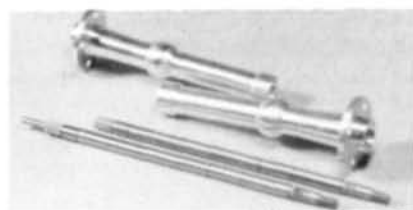


MINICRAFT Engraving and Security Kit

Minicraft's MB186 Engraving and Security Kit includes a lightweight, pen-style engraver, a plug-in transformer, a diamond bit, two grinding stones and stencils. The unit works on metal, plastic, crystal and glass, so you can use it to mark your cameras, transmitters, chargers and even R/C cars.

Price: \$39.95

For more information, contact Minicraft, 1 Perfection Pl., Ridgely, MD 21685.



JPS Clod Straight Axles

These durable, steel, straight axles improve your Clod Buster's straight-line handling and pulling ability by eliminating its rear steering capabilities. The axle tubes are machined out of billet aluminum. Front-end axles and tubes are also available. (Sold in pairs.)

Part nos. 7065 (straight axles); 7061 (aluminum straight-axle tubes).

Prices: \$69.99; \$98.99.

For more information, contact JPS Custom Wheels, P.O. Box 3014, Fullerton, CA 92634.



RAPID R/C ACCESSORIES Alumi-Lights Rims

Machined of solid, billet-aluminum bar stock, Alumi-Lights rims are strong, durable and good looking, yet they're as light as plastic. They're available in clear, gold, red, blue and black and in sizes to fit most cars and trucks.

For more information, contact Rapid R/C Accessories, 1324 Ojai Rd., Santa Paula, CA 93060.

Descriptions of new products appearing on these pages were derived from press releases supplied by their manufacturers and/or their advertising agencies. The information given here does not constitute endorsement by **Radio Control Car Action**, nor is it a guarantee of product performance or safety. When contacting a manufacturer about any product described here, be sure to mention that you read about it in **Radio Control Car Action**.

LETTERS

(Continued from page 178)

TRY AGAIN, WESLEY!

I own a Lunch Box and a Sledgehammer, but I'm seriously considering racing competitively. I want to buy a Kyosho Lazer ZX-R 4WD racer, and I want to know if Parma cobalt magnets and the Nova two-speed gearbox are race-legal. Can I legally use a Clod Buster 4400mAh battery pack (it gives 45-minute run times) in competition?

One last thing: I read that the Lazer ZX-R rims aren't legal in competition. Could you recommend some tires and rims that will fit and are legal? Thanks for the time, and keep turning out the mags!

WESLEY SHIFFLETT

Stuarts Draft, VA

If you race under ROAR or NORRCA rules, yes, the Parma cobalt magnets are illegal. (The NR/CTPA allows cobalt magnets in their sled-pulling classes.) Any type of two-speed tranny is also illegal for

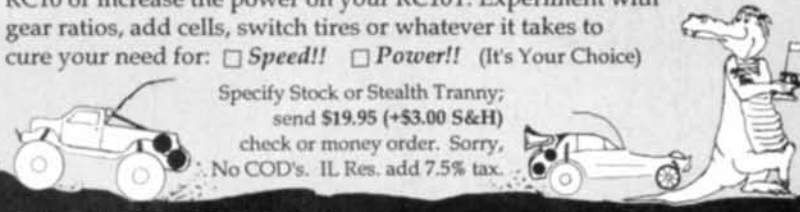
classes other than 1/8-scale on-road. No, the 4400mAh batteries aren't allowed. Only sub-C cells are allowed, and the 4400 cells are Ds. The stock rims that come with the ZX-R are Kyosho's 2.2-inch rims, which are illegal for ROAR-sanctioned races. All of these mods aren't bad, and some, like the two-speed tranny (which yields quicker acceleration, higher top speeds and longer run time) are good, but to keep competition as fair as possible, they've been ruled illegal. AS

NEW! **DO YOU HAVE THE NEED FOR SPEED??**

Have fun increasing the Power on your RC10 and now the RC10T. Send for instructions and "Key" Aluminum Motor Mount that will allow you to mount Two Motors to your RC10 transmission. *That's right, 2 motors!* With the dual power kit it is quick and easy to increase the speed of your RC10 or increase the power on your RC10T. Experiment with gear ratios, add cells, switch tires or whatever it takes to cure your need for: ☐ Speed!! ☐ Power!! (It's Your Choice)

Specify Stock or Stealth Tranny; send \$19.95 (+\$3.00 S&H) check or money order. Sorry, No COD's. IL Res. add 7.5% tax.

ALLIGATOR DESIGNS P.O. BOX 68838, SCHAMBURG, IL 60168



Great gift idea:

a subscription to:

**RADIO CONTROL
CAR ACTION**

1-800-877-5169

ADVERTISER INDEX

A&L Manufacturing	66	Hobby Warehouse	152-153	RC Performance Specialties	47
Ace Hardware	90	Horizon Hobby Distributors	131	R/C Race Prep	87
Airtronics	4	Impulse Inc.	43	Retailer Ad	72
Alligator Designs	186	JPS Custom Wheels	41,47	Robinson Racing Products	127
America's Hobby Center	120	JR Remote Control	138	Rocket City R/C Specialties	46
Andy's R/C Products	9	Kyosho	C2,73,75,111	S&K Racing Products	132
Associated Electrics	38,48-49,113,130,136-137,167,C3	Lavco USA	90	Saiko Racing Product	66
Astro Flight	58	Litespeed	50	Sanyo Energy Corp.	78
Autographics of California	9	LRP	171	Sassy Chassis	110
B&B Software	106	Lunsford Racing	46	Schumacher Inc.	62,171
B&R Motor Works	91	McAllister Racing	179	Sheldon's Hobbies	182-185
Ballistic Batteries	176	Model Rectifier Corporation	C4	Shields Aviation	46
Bolink R/C Cars, Inc.	170	Moore's Ideal Products	60	SKYS	134
Bruckner Hobbies	140-141	Nationwide Hobbies	168	Southside Hobbys	155
Bud's Racing Products	33	Neron Associates	118	Stage III	89
C&M Team Cobra	134	New England Hobbies	178	Stealth Electronics	157
Cats West	118	Novak Electronics	28,81	Stevens & Son R/C Products	90
Central Model Marketing	82	Omni Models	135	Stormer Hobbies	100-103
Cheetah Racing	57	Panasonic Ind. Co., Battery Sales Group	59	Swim Engineering	176
Competition Batteries	157	Parma International	54,76	T&A Machine Products	57
Competition Electronics, Inc.	151	PC Hobbies	66	Team Losi	92
Custom Works	175,177,179	Pearce Hobbies	178	Tech-Toys	106
Dahn's Racing Bodies	8	Pro-Line USA	25,30	TEKIN	22,139
Dan's RC Stuff	118	Protoform	138	The Finest R/C	172-174
DuraTrax	119	Quick R/C	178	The Inside Line	178
Empire Models	134	Race Space	109	Thorp Manufacturing, Inc.	7
ERI	175	Racer's Choice	34	T.O.P. Models	157
ESP, Inc.	126	Radio Control Kar	42	Tower Hobbies	142-150
Futaba Corp.	15,112	RAm	177	TRC	70
GLD Racecars	89	Ranch Pit Stop	10-11	Trinity Products	3,18-19,27,53
Great Northern Hobbies	116-117	R/C Buyers' Club	74	Twister Motors	13
Hammad Ghuman	89	R.C.C.A. Action Series Subscription	67	Ultra5	176
Hobby Centro	158	R.C.C.A. Back Issues	124-125	Victor Engineering	121
Hobby King	158	R.C.C.A. Buyers' Mart	159-166	Walt's Hobby	89
Hobby Products International	169	R/C International	133	World of Trains	178
Hobby Shack	122-123	R/C Motor Sports of Miami	126		